3.0 AFFECTED ENVIRONMENT

The proposed infrastructure would be located within the USBP's Naco and Douglas Stations' AOs. Field reconnaissance surveys were conducted along the proposed corridor to ascertain the existing conditions. The surveys were conducted during the month of April 2002; however, surveys were also conducted as a part of the numerous NEPA documents from which this SEA is tiered or referenced. The results from these previous surveys are also incorporated into the following discussions and subsequent impact analysis. Only those parameters that have the potential to be affected by the proposed action are described. General descriptions of the resources at or surrounding the project corridor are provided in the following subsections.

3.1 LAND USE

Southern Arizona supports a multitude of land uses including agriculture, rangeland, urban, forest, recreation/special use, and water. Generally, land use has been indicative of its owner or steward. The largest areas of land within southern Arizona are controlled by the USFS and the BLM. The major state agencies controlling large areas of land are the Arizona State Land Department, Arizona State Parks, and the Arizona Game and Fish Department. Native American Nations also own significant areas. Specialized agricultural land or large tracts of rangeland used for grazing are often owned by either private citizens or corporate businesses. Smaller areas of land are controlled by other Federal agencies, such as, the National Park Service (NPS), Department of Defense (DoD), and USFWS, as well as county and municipal agencies.

3.1.1 Land Use in Cochise County

The total area of Cochise County is 6,170 square miles of primarily rural setting. The principal land use outside the urban areas is comprised of rangeland, agriculture (cotton, alfalfa, barley, corn, and vegetables), and recreation areas.

Land ownership along and north of the project corridor is categorized in Figure 3-1. The largest category is in private and corporate ownership. The second largest landowner is the State of Arizona, which controls areas used primarily for recreation, historical, and

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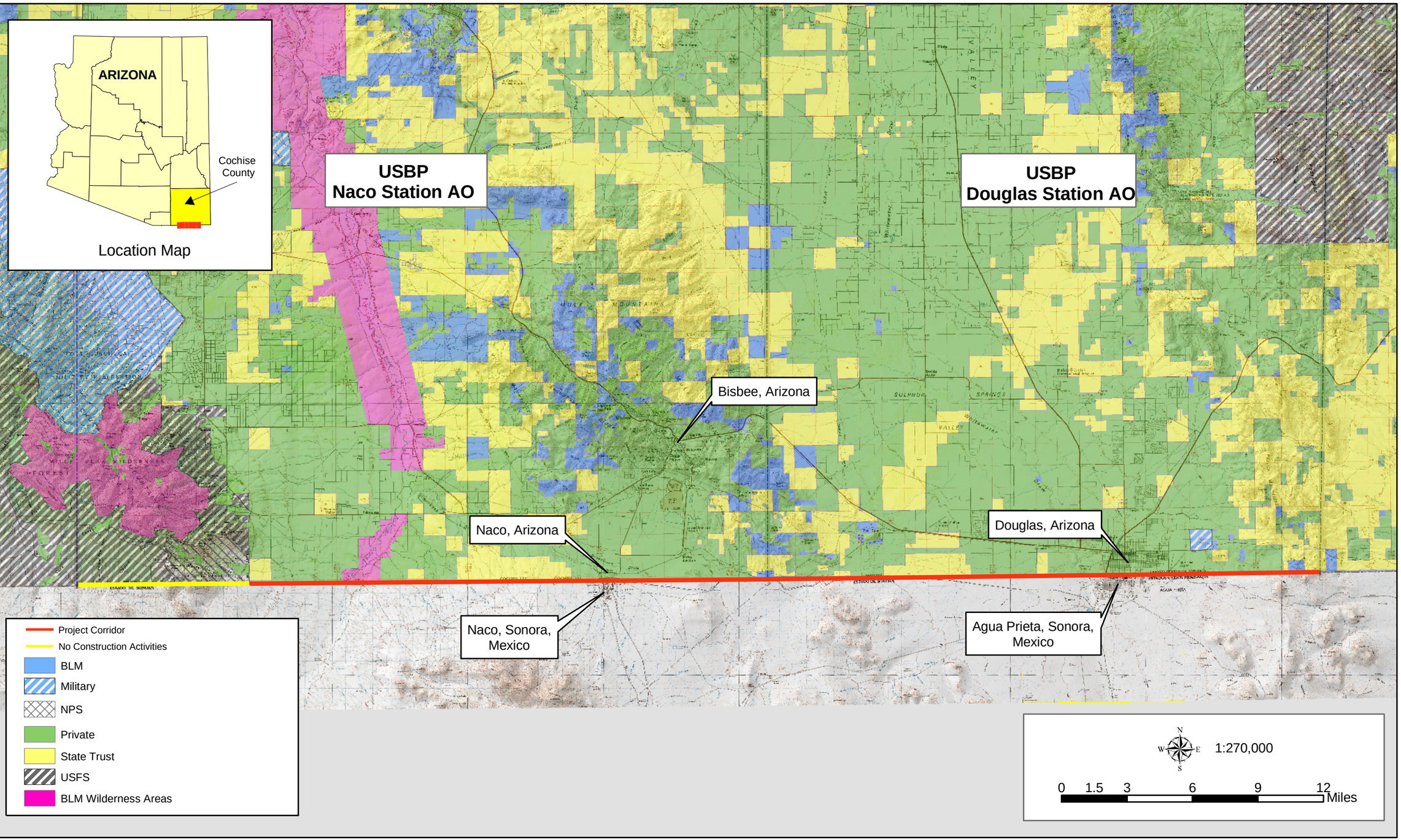

Figure 3-1: Naco/Douglas Project Corridor
Land Ownership

Sources: USGS 1:100,000 Digital Raster Graphics
Land Ownership was obtaind from USGS GAP, 2002
Project area data from GSRC, 2002.

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natural areas. Much of this land is held under public land trusts for the purpose of preservation, whereby property owners sell real estate development rights to the State of Arizona in return for ownership with a conservation easement. Finally, the Federal government is the third largest landowner with the USFS controlling approximately 490,000 acres; the majority of which is comprised of the multiple-use Coronado National Forest. The USFWS controls the San Bernardino National Wildlife Refuge (NWR) and Leslie Canyon NWR in the southeastern portion of Cochise County, while the BLM controls approximately 350,000 acres of rangeland and unique and sensitive areas. The BLM land includes the Chiricahua National Monument (managed by the NPS), San Pedro Riparian National Conservation Area (NCA), and numerous multiple use areas leased to ranchers for grazing. The NPS owns and manages the Coronado National Memorial, approximately 4,750 acres of grasslands and oak woodlands, in the southern portion of the Huachuca Mountains.

3.1.1.1 Cochise County Comprehensive Plan

In 1994, the Cochise County government adopted a comprehensive growth plan to promote and guide future growth in a well-planned manner. With its latest amendment in 2002, the purpose of this plan is to achieve a balance among urban, rural and public land uses, which will enhance the customs, culture, economy and the qualities of the places where people choose to live (Cochise County 2002).

The vast majority of the project corridor resides within rural areas, which serve as rural/residential, agricultural areas and not as identifiable urban communities. The communities of Naco and Douglas have been designated as growth areas. In and near the southern portions of the City of Douglas the project corridor is surrounded by urban growth areas where the plan supports a moderate urban style growth. In particular, the areas that would be affected by construction activities under this SEA are designated with an ability to support commercial and industrial growth. In the Town of Naco the comprehensive plan supports a more rural growth trend with several areas designated as open space particularly along the U.S.-Mexico border, where it favors a slower rate of change and preserves the small town atmosphere.

3.1.2 Land Use in the Project Corridor

The total project corridor (300 feet by 57 miles) consists of approximately 2,069 acres of mostly rural open space and rangeland primarily utilized for cattle grazing, while a small percentage is mainly used for the conservation of sensitive and unique habitat. The majority of the land within the project corridor is privately owned or designated as state trust lands utilized by local ranchers as livestock grazing areas. The BLM manages the San Pedro Riparian NCA. The BLM also manages 277 grazing allotments across Arizona; two of these allotments occur within the project corridor and are located along the U.S.-Mexico Border south of Paul Spur, west of Douglas (BLM 2003). This area accounts for approximately 98 acres. Other Federally owned areas are located in the Coronado National Forest, controlled by the USFS, and the Coronado National Memorial, managed by the NPS. In particular, approximately 20 percent of the project corridor is specified as the Roosevelt Easement, a Presidential Proclamation on May 27, 1907 that dedicated the first 60 feet north of the U.S.-Mexico border under Federal regulation.

3.2 ASTHETIC AND VISUAL RESOURCES

Aesthetics is essentially based on an individual or group of individuals' judgment as to whether or not an object is pleasing, and/or would influence quality of life. The major visual appeal to southern Arizona lies in its vast areas of naturally occurring landscape. It is known for its tranquil dark skies and scenic mountain ranges. The project corridor is positioned across scenic valleys between two mountain ranges. The Town of Naco and the City of Douglas are the only urban areas that exist within the project corridor. The majority of new infrastructure components would be installed within portions of the Sulphur Springs Valley and the San Pedro Valley, between the Parilla Mountains and the Huachuca mountains. Several unique and pristine areas exist within the corridor and contribute to the overall beauty of the southern desert region. For example, the San Pedro Riparian NCA is a rare, unique occurrence of lush vegetative habitat that can be seen for miles and is virtually, an oasis among the desertscrub surroundings. To the west of the San Pedro Riparian NCA lies the breathtaking scenery of the southern edge of the Huachuca Mountains, which contains the Coronado National Memorial and Coronado National Forest. The scenery from the roadside viewing area at the top of

Montezuma's Pass in the Coronado National Memorial portrays the entire picture of the relatively untouched scenic beauty of southeastern Arizona and Sonora, Mexico.

The BLM's management plan, which was adopted in 1989, manages visual impacts in the San Pedro Riparian NCA under its Visual Resource Management System (VRM) (USDOI 1989). The VRM system is composed of 4 classes:

- Class I The objective is to preserve the existing character of the landscape (Research Natural Areas [RNA]). This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II The objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
- Class III The objective is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- Class IV The objective is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

The San Pedro Riparian NCA management plan dedicates approximately 86% of the NCA land as VRM Class I and II. The project corridor exists primarily in the Class II designation, within the scenic valley bottom along the San Pedro River. The nearest RNA is known as the San Rafael RNA and is located approximately 8 miles north of the project corridor.

As discussed in Section 1.2 in an excerpt taken from a letter written by James Bellamy, Superintendent at the Coronado National Memorial to Senator Jon Kyl on June 20, 2000, past UDA traffic has greatly degraded the appeal of the landscape. Also, human caused fires, which destroy thousands of acres; excessive amounts of litter such as plastic water bottles; and illegal roads that impact pristine landscape on the Coronado

National Memorial, have all taken a negative toll on the landscape (INS 2002d). Based on USFS estimates, UDAs leave behind 8 to 10 pounds of trash per person at a cost of $0.25 per pound for clean up (USFS 2003). Given the 2002 UDA apprehension rate (125,900 individuals) for the Naco-Douglas area this amounts to at least $283,275 in annual trash removal costs. This figure does not account for UDAs that avoid apprehension.

3.3 TRANSPORTATION

3.3.1 Roadways

The highway system within Cochise County is somewhat well developed, especially the interstate highway system (Rand McNally 1997). The major transportation routes in the region are presented in Figure 3-2. Interstate 10 runs through Cochise County and continues west through the cities of Tucson and Phoenix. U.S. Highway 90 runs from Interstate 10, through Sierra Vista, to Bisbee. U.S. Highway 92 also runs from Sierra Vista to Bisbee, but takes a more southern route near Naco where it intersects the Coronado Memorial Highway. At this point, it runs east and provides access to the Coronado National Forest and Coronado National Memorial. U.S. Highway 80 runs from Interstate 10 (at Benson) to the New Mexico border, passing through Bisbee and Douglas. From Graham County (just above Cochise County), U.S. Highway 191 intersects Interstate 10 and runs south to Douglas. U.S. Highway 181 connects U.S. Highway 191 to the Chiricahua National Monument. U.S. Highway 186 also provides access to the Chiricahua National Monument via Interstate 10 at Wilcox.

The project corridor contains two legal POEs. One is located in the Town of Naco at its intersection with South Towner Avenue while the other is located in the City of Douglas. Substandard gravel and dirt roads primarily utilized by USBP agents and local landowners provide limited access to the project corridor.

3.3.2 Railroads

The Southern Pacific Railroad used to have operations in the area, but the company merged with Union Pacific Railroad in 1996 (Union Pacific 2000). There is currently no rail line in-use within the project corridor; however, the old Southern Pacific rail lines are still present.

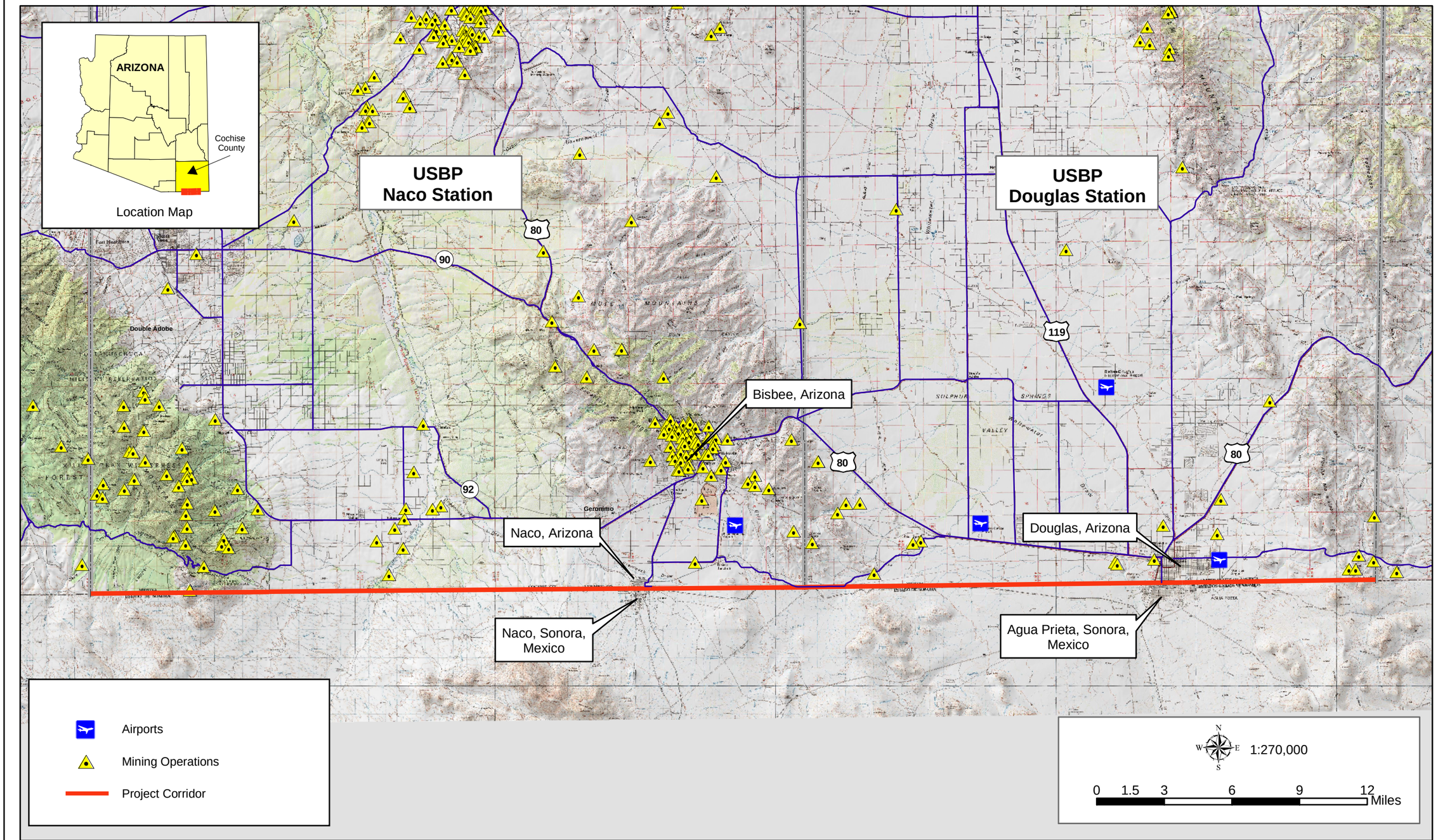

Figure 3-2: Naco/Douglas Project Corridor
Transportation and Mining Operations

Sources: USGS 1:100,000 Digital Raster Graphics
Land Ownership was obtaind from USGS GAP, 2002
Project area data from GSRC, 2002.

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3.3.3 Airports

There are eight small commercial airports located within Cochise County. These small to medium sized airports do not conduct regularly scheduled commercial or commuter flights. The closest operating airports are the Bisbee Municipal Airport, located approximately 5 miles south of Bisbee and 3 miles north of the project corridor, and the Douglas Municipal Airport, located east of Douglas and adjacent to the project corridor (see Figure 3-2).

3.3.4 Mining Operations

The value of Arizona's mineral production in 2000 was $2.8 billion and Arizona accounted for more than 65 percent of the U.S. copper production, leading the Nation in the production of this commodity as it has for decades. In 2000, the Arizona copper industry used approximately 187,900 acres of the state's more than 72,960,000 acres (Arizona Mining Association 2000 and ADMMR 2002). Hundreds of active and inactive mines are located throughout the county (see Figure 3-2). However, an accurate quantification of what is actually in operation is limited to available data held by the Arizona Department of Mine and Mineral Resources (ADMMR) and changes periodically. Based on recent field surveys, there are no active mines in the immediate vicinity of the project corridor. Bisbee operates several tourist industries based on past mining in the area, such as the Bisbee Mining and Historical Museum and Copper Queen Mine Tours. The slag (a waste-product from the copper smelting process) from a previous copper smelting plant exists on a small portion of the project corridor adjacent to Whitewater Draw, west of the City of Douglas.

3.4 GEOLOGY, SOILS, AND PRIME FARMLAND

3.4.1 Geologic Formations

Geological resources include physical surface and subsurface features of the earth such as topography, geology, soils, and the seismic nature of the area. Three geologic provinces occur in the State of Arizona: the Basin and Range Province, the Central Highlands, and the Colorado Plateau Province. The proposed project corridor exists entirely within the Basin and Range Province. Deposits within the project corridor consist predominantly of surficial deposits dating to the Holocene to Middle Pleistocene epochs followed by sedimentary rocks with local volcanic units dating to the Cretaceous

to the late Jurassic period. Also within the project corridor, though to a lesser extent, are young alluvium deposits dating to the Holocene to later Pleistocene epochs, older surficial deposits dating to the middle Pleistocene to later Pliocene epochs, and volcanic rocks dating to the middle Miocene to Oligocene epochs.

3.4.2 Soils

The major soils in the project corridor are associated with elevations ranging from 2,200 feet msl on level ground up to 6,000 feet msl on steep, exposures of the Huachuca Mountains in the western section of the project corridor. The dissecting fans of old alluvium are broad and moderately sloping in nature and extend from the relatively narrow, recent alluvial floodplains to the bases of rising mountain ranges (NRCS 2002a).

Soil Survey Geographic (SSURGO) data, provided by the Natural Resources Conservation Service (NRCS), identifies 27 soil complexes, associations, or series (Table 3-1). SSURGO data were queried from this NRCS database. Figure 3-3a and Figure 3-3b provide a general depiction of where these soils are located in reference to the project corridor. These soils consist of loamy to very gravelly soils with slopes from 0 to 60 percent. However, due to the limits of existing soil data, approximately 22% of the project corridor that exists primarily within the Huachuca Mountains and Coronado National Memorial and the Coronado National Forest are not characterized by SSURGO data.

However, the Corridor EA evaluated three soil associations that exist within the Coronado National Memorial and the Coronado National Forest based on 1985 data (Hendricks 1985). These soil associations are depicted in Figure 3-3a, and include the White House-Bernardino-Hathaway Association, Lithic Haplustolls-Lithic Argiustolls-Rock Outcrop Association, and Casto-Martinez-Canelo Association. Alternatives analyzed in this SEA do not include any activities within the Coronado National Memorial or the Coronado National Forest and therefore would not impact any of the soil associations located within this area. Nevertheless, the soil associations in this area are comprised of a broad mix of soil complexes and soil series that occur from a range of 3300 feet msl in the fan alluvium to 7,00 feet msl on the tops of mesa's and mountains.

Table 3-1. SSURGO Soil Complex Descriptions Based on 2002 Data

Soil	Percent Slope	USDA Texture
ALTAR-MALLET COMPLEX	0 to 3	sandy loam to extremely cobbly coarse loamy sand
BLAKENEY-LUCKYHILLS COMPLEX	3 to 15	fine sandy loam to loam
BROOKLINE-FLUVAQENTS-RIVERWASH COMPLEX	0 to 3	sandy loam to very gravelly coarse sand
BRUNKCOW-CHIRICAHUA-ANDRADA COMPLEX	3 to 20	coarse sandy loam to weathered and unweathered bedrock
COURTLAND-DIASPAR COMPLEX	0 to 3	sandy loam gravelly sandy clay loam
COURTLAND-SASABE-DIASPAR COMPLEX	1 to 8	sandy loam to clay loam
ELOMA SANDY LOAM	1 to 10	gravelly loam to very gravelly sandy clay loam
ELOMA-CARALAMPI-WHITE HOUSE COMPLEX	0 to 5	very gravelly sandy loam to very gravelly course sandy loam to extremely gravelly clay
GARDENCAN-LANQUE COMPLEX	0 to 5	sandy loam sandy clay loam to very cobbly sandy clay loam
GUEST-RIVEROAD ASSOCIATION	0 to 1	clay loam to silty clay loam to sandy loam
KAHN COMPLEX	0 to 3	fine sandy loam to clay loam
LIBBY-GULCH COMPLEX	0 to 10	very gravelly sandy loam to gravelly clay loam
LUCKYHILLS-MCNEAL COMPLEX	3 to 15	very gravelly sandy loam to sandy loam to gravelly loam
MABRAY-CHIRICAHUA-ROCK OUTCROP COMPLEX	3 to 45	very cobbly loam to weathered bedrock and unweathered bedrock
MABRAY-ROCK OUTCROP COMPLEX	3 to 45	extremely cobbly loam to unweathered bedrock
NOLAM-LIBBY-BUNTLINE COMPLEX	1 to 10	fine sandy loam to gravelly fine sandy loam to sandy clay loam
PITS-DUMPS COMPLEX	No Slope	(No defined texture)
RIVEROAD AND UBIK SOILS	0 to 5	silt loam to fine sandy loam
RIVERWASH-BODECKER COMPLEX	0 to 3	stratified gravel to loamy fine sand to very gravelly coarse sand
SASABE COMPLEX	0 to 3	sandy loam to silt loam
SUTHERLAND-MULE COMPLEX	3 to 15	gravelly fine sandy loam to very gravelly sandy loam
TENNECO FINE SANDY LOAM	0 to 2	fine sandy loam
UBIK COMPLEX	0 to 3	silt loam to fine sandy loam
WHITE HOUSE COMPLEX	1 to 30	gravelly loam to gravelly sandy loam to clay loam

Source: NRCS 2000, 2002b

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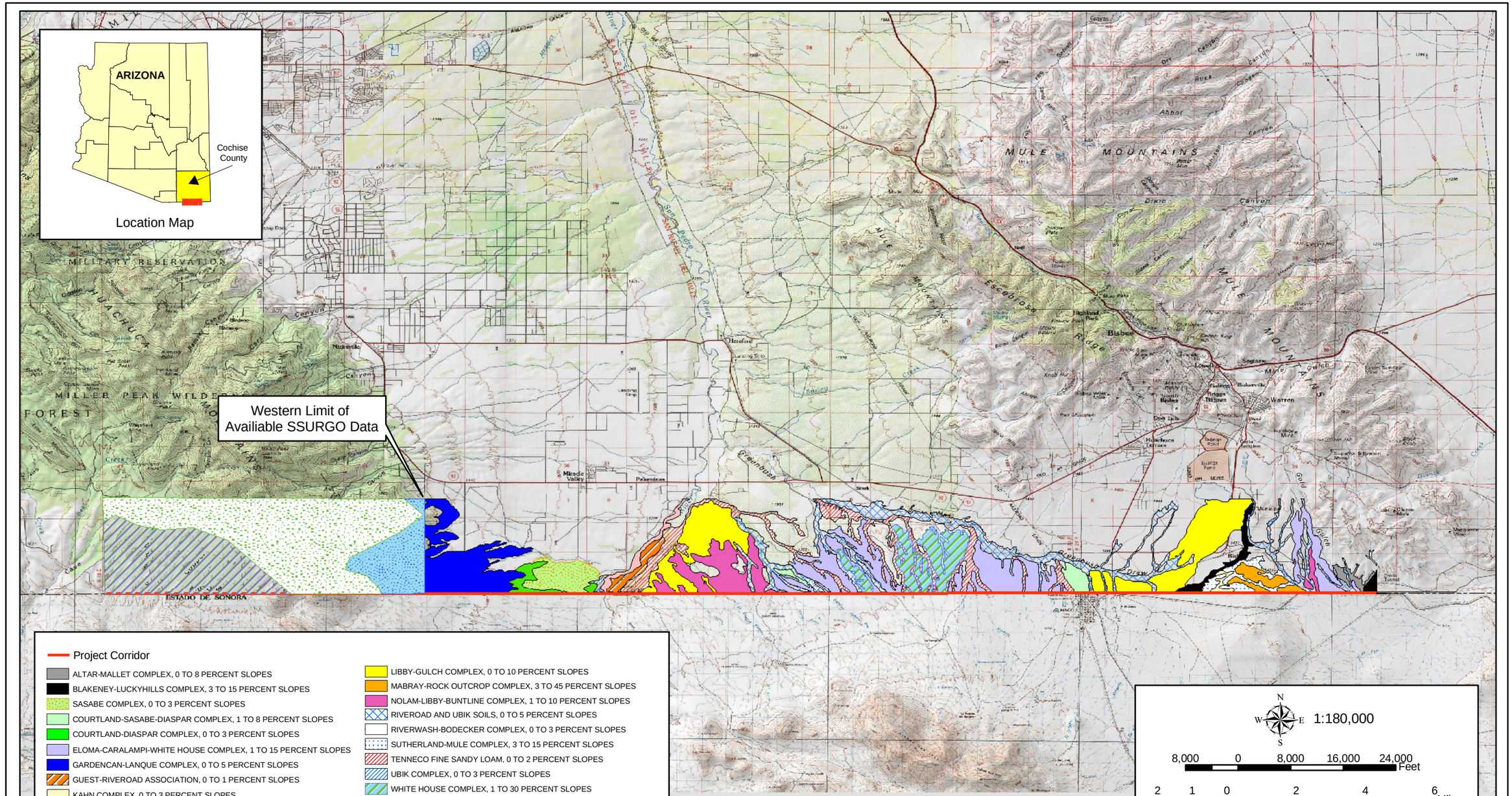

Sources: USGS 1:100,000 Digital Raster Graphics
SSURGO Soil Classifications were obtained from NRCS, 2002
General Soil Map classifications from U.S. Dept. of Agriculture- Soil Conservation Service and University of Arizona Experimental Station, 1975. Project area data from GSRC, 2002.

Figure 3-3a: SSURGO Soil Classifications and General Soil Map Associations in the Naco AO

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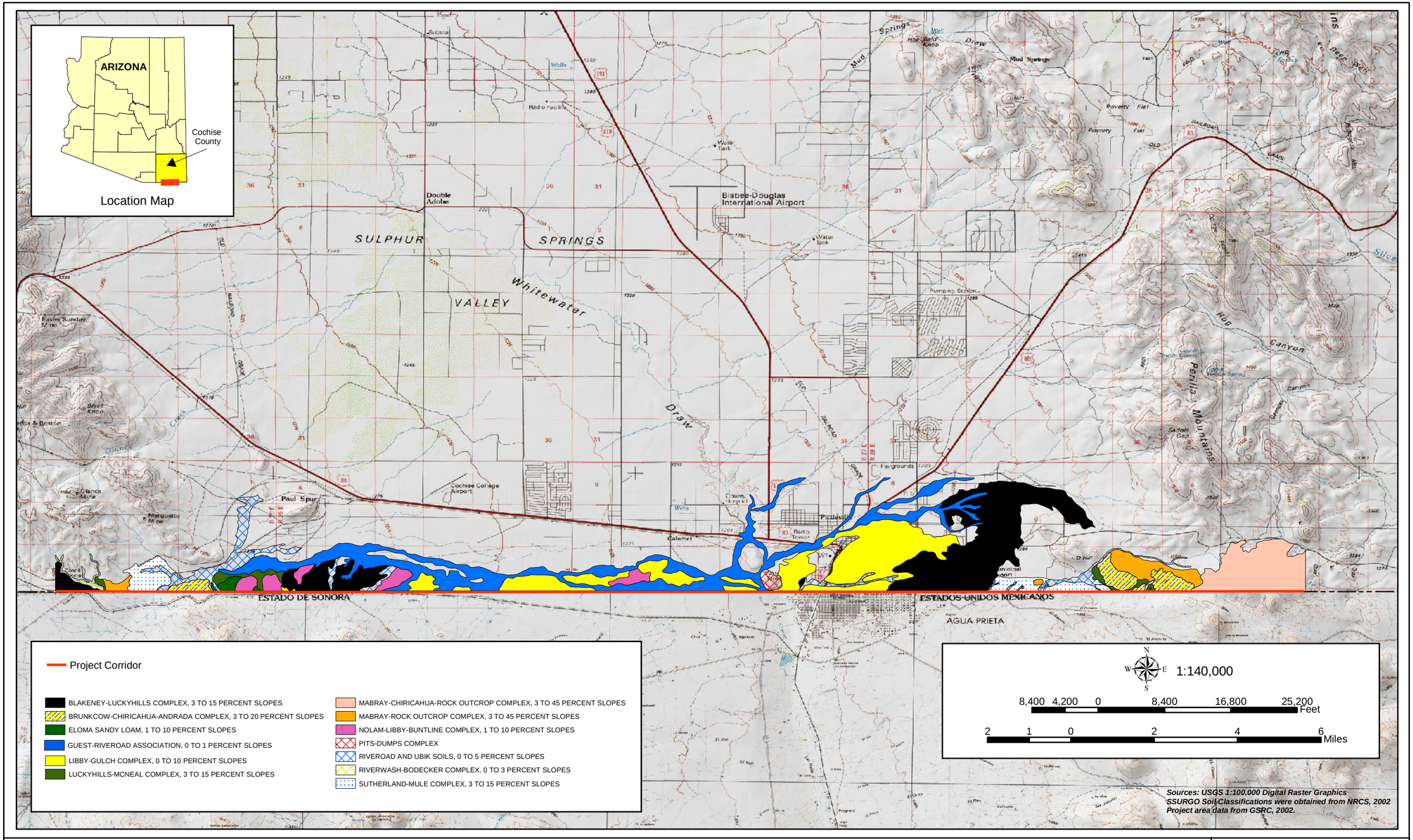

Figure 3-3b: SSURGO Soil Classifications in Douglas Project Area

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3.4.3 Hydric Soils

A hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper profile. According to the NRCS, no hydric soils have been mapped within Cochise County or in the project corridor (NRCS 2002a); however, 8.3 acres of potential jurisdictional wetlands were identified within the corridor during the April 2002 survey. Soils within these potential jurisdictional wetlands are likely functioning as hydric soils.

3.4.4 Prime Farmland

According to 7 U.S.C. 4201(c)(1)(A), prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, labor, and without intolerable soil erosion. Unique farmland is defined as land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as, citrus, nuts, olives, cranberries, fruits, and vegetables (7 U.S.C. 4201(c)(1)(B)).

Potential prime farmland is present along the U.S.-Mexico border and has recently been mapped within the project corridor (Figure 3-4). These soils are associated with the Tenneco, fine sandy loam and the Ubik Complex and are generally found in stream terraces, existing floodplains, and relic basins. These soils are considered prime farmland only if properly irrigated. Furthermore, they are generally located within washes that are either not suitable for agriculture due to the topographic position and flash floods or within areas preserved for habitat conservation.

3.5 VEGETATION

Southeastern Arizona predominantly supports plant communities defined as semi-desert grassland scrub, which is a perennial grass-scrub community that is usually located between desertscrub and higher elevation plant communities. Intermixed among this primary community are several inclusions of other desertscrub communities, as well as topographically-associated areas such as riparian and forested areas. These habitat types are primarily found in southeastern Arizona, southwestern New Mexico,

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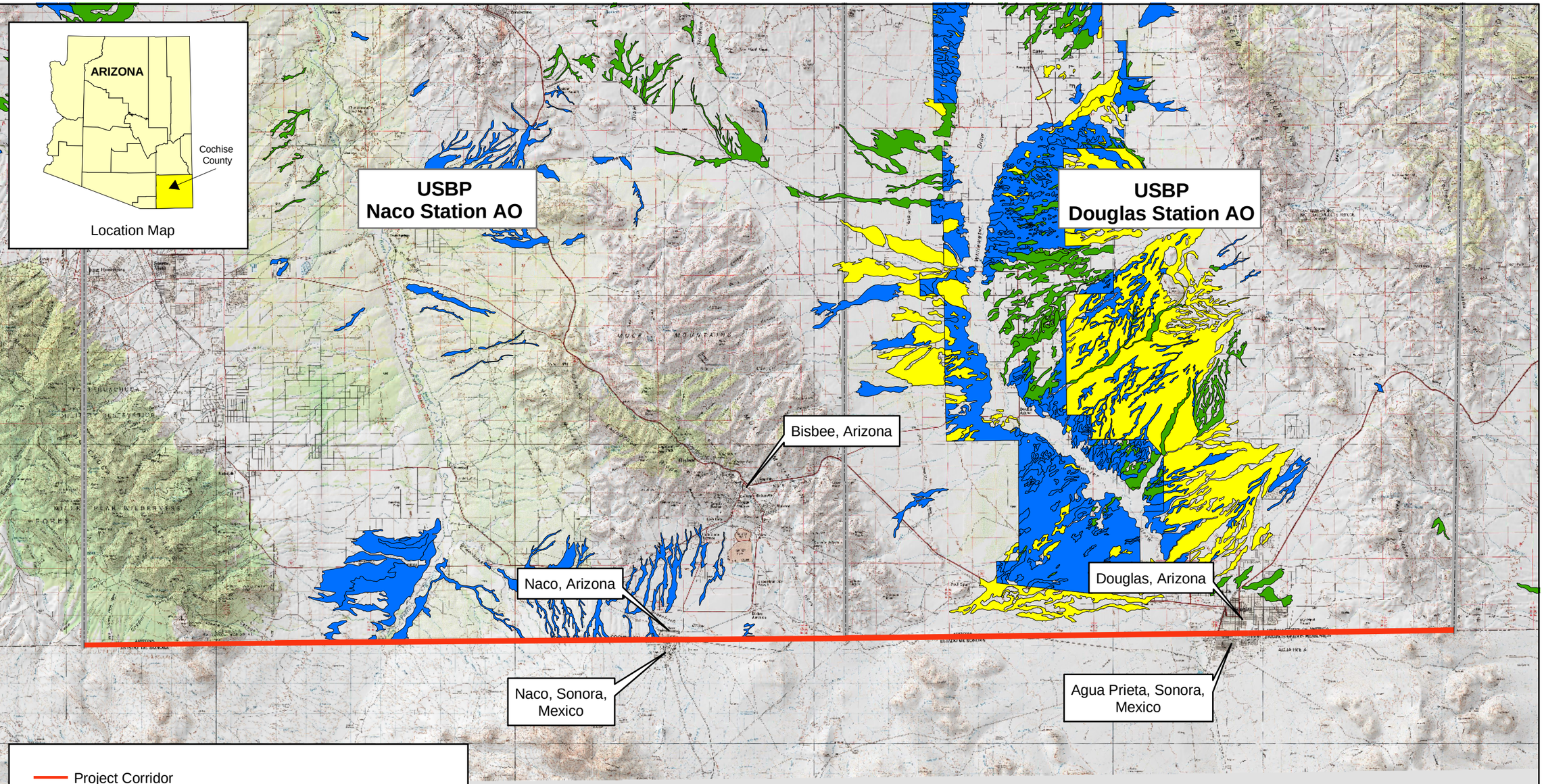

Figure 3-4: Naco/Douglas Project Corridor
Prime Farmland

Sources: USGS 1:100,000 Digital Raster Graphics
Farmland data was obtaind from SSURGO, 2002
Project area data from GSRC, 2002.

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and northern Mexico between elevations of 4,000 and 8,000 feet msl. Below is a brief description of vegetation survey methods and results.

3.5.1 Vegetation Communities

A field reconnaissance survey was performed in April 2002 within the limits of the project corridor (within 300 feet of the U.S.-Mexico border). A total of eight pedestrian transects beginning 60 feet north of the U.S.-Mexico border and located at equidistants there after were traversed the length of the project corridor. This survey was conducted in an effort to inventory biological resources in the project corridor and evaluate the potential effects of the action alternatives on these resources. Data collected from this survey have been analyzed, acreages calculated, and communities mapped using color infrared photography for the entire project corridor. The vegetative community maps are provided in Appendix A.

As expected, the April 2002 survey was consistent with previous investigations (INS 2000; USACE, 1994, 1996). The survey concluded that six major vegetation communities dominate the project corridor: semi desert grassland-scrub, Chihuahuan scrub, riparian scrub, interior riparian forest, interior chaparral, and encinal mixed oak. The nomenclature for vegetation community types is derived from the 1993 National Biological Survey's Geographic Analysis Program (GAP). Areas that are considered disturbed were also delineated during this survey. These areas were identified as urban development, as well as any area that had been disturbed by existing infrastructure and vehicular or other traffic, which has resulted in a lack of vegetation. Plant species that were found within the six major vegetation communities throughout the project corridor are identified and discussed in the following paragraphs.

3.5.1.1 Semi-desert Grassland Scrub

Semi-desert grassland scrub is prevalent in the valley areas of the project corridor accounting for 42 percent (736 acres). This vegetation community was dominated by grama grasses (*Bouteloua* spp.), plains lovegrass (*Eragrostis intermedia*), Arizona cottontop (*Digitaria californica*), honey mesquite (*Prosopis glandulosa*), aster (*Aster* sp.), and fairy duster (*Calliandra eriophylla*). Other species which are associated with this community include: acacia (*Acacia* sp.), ocotillo (*Fouquieria splendens*), cholla (*Opuntia fulgida*), little leaf sumac (*Rhus microphylla*), sotol (*Dasylirion wheeleri*), desert broom

(*Baccharis sarothroides*), tobosa grass (*Hilaria mutica*), broom snakeweed (*Gutierrezia sarothrae*), desert hackberry (*Celtis pallida*), one-seed juniper (*Juniperus monosperma*), and alkali sacaton (*Sporobolus airoides*). This vegetation community was generally found to have less than 15 percent ground cover.

3.5.1.2 Chihuahuan Scrub

The Chihuahuan scrub plant community is prevalent throughout southeast Arizona. Over 33 percent (577 acres) of the project corridor is dominated by the Chihuahuan scrub community with ground cover densities between 35 and 40 percent. The plant community consists of creosote bush (*Larrea tridentata*), tarbush (*Flourensia cernua*), mesquite (*Prosopis* sp.), lechuguilla (*Agave lechuguilla*), sotol, banana yucca (*Yucca baccata*), mimosa (*Mimosa* sp.), acacia, and ocotillo. Several other species that were identified during the April 2002 surveys included four-wing saltbush (*Atriplex canescens*), hedgehog cactus (*Echinocereus triglochidiatus*), and allthorn (*Koeberlinia spinosa*).

3.5.1.3 Riparian Scrub

As the name implies, this vegetative community is located in riparian areas adjacent to drainages and natural washes. The riparian scrub community was observed generally transecting the project corridor and accounted for approximately 7 percent (115 acres) of habitat within the project corridor. This community is dominated by honey mesquite, grama grasses, and desert broom with ground cover and/or canopy densities exceeding 75 percent. However, other species identified included acacia, white bursage (*Ambrosia dumosa*), soapberry (*Shepherdia canadensis*), dropseeds (*Sporobolus* sp.), and encelia (*Encelia* sp.).

3.5.1.4 Encinal Mixed Oak

Encinal mixed oak vegetation communities are often very diverse areas. Within the 300-foot survey corridor, this community consistently had densities ranging from 60 to 70 percent ground cover. The vegetation type was found exclusively within and west of the Coronado National Memorial. However, the 143 acres of Encinal mixed oak community type within the project corridor would not be subject to the proposed infrastructure activities under any of the alternatives, and therefore, would not be affected. This community type was typically found in the higher elevations and consists of emory oak (*Quercus emoryi*), Arizona white oak (*Q. arizonica*), Mexican blue oak (*Q. oblongifolia*),

silverleaf oak (*Q. hypoleucoides*), pinyon pine (*Pinus edulis*), alligator juniper (*Juniperus deppeana*), and Mexican pinyon (*P. cembroides*).

3.5.1.5 Interior Chaparral

Interior chaparral vegetation community generally occupied the lower slopes of mountainous areas above the grasslands. The ground cover densities were between 80 and 85 percent. The April 2002 surveys revealed that one percent (18.5 acres) of the affected project corridor is comprised of interior chaparral. This community supports vegetation that is a mix of shrubs, small trees, and grasses. Some of the more common interior chaparral species found in the project corridor were sugar bush (*Rhus ovata*), desert ceanothus (*Ceanothus greggii)*, sideoats grama (*Bouteloua curtipendula*), purple verbena (*Verbena wrightii*), Parry's agave (*Agave parryi*), and plains lovegrass. Other species observed include sneezeweed (*Helenium* sp.), acacia, ocotillo, cholla, soap tree yucca (*Yucca elata*), prickly pear (*Opuntia* sp.), aster, little leaf sumac, and sotol.

3.5.1.6 Interior Riparian Forest

The interior riparian forest vegetative community is isolated to those lands where the project corridor transects the San Pedro River floodplain. Approximately, 1.8 acres of interior riparian forest were located within the project corridor. This area was primarily comprised of mature trees such as Goodding willow (*Salix gooddingii*), Fremont cottonwood (*Populus fremontii*), and American sycamore (*Plantanus occidentalis*) and was limited to the stream banks of the San Pedro River. Other shrubs and grasses found in this area included, saltcedar (*Tamarix* sp.), rubber rabbit bush (*Chrysothamnus nauseosus*), grama grass, and acacia.

3.6 WILDLIFE

The native fauna of southeastern Arizona, which encompasses Cochise County, includes approximately 370 bird species, 109 mammals, 23 amphibians, and 72 reptiles. While the U.S.-Mexico border designates territories of the U.S. and Mexico, many species that inhabit the borderlands rely on suitable habitat on both sides of the border for sustainment. This behavior is known as trans-boundary migration. The bird population is dominated by sparrows and towhees (35 species); wood warblers (32 species); swans, geese, and ducks (31 species); tyrant flycatchers (30 species); and

sandpipers and phalaropes (26 species). Bird species diversity is highest in the spring and fall when neotropical migrants (i.e., flycatchers and warblers) pass through on their way to summer breeding or wintering grounds, and in the winter when summer resident birds (i.e., robins, kinglets, and sparrows) from the northern U.S. and Canada arrive to winter in the area. The majority of the mammal species found in the area are bats and rodents (i.e., mice, rats, and squirrels). Rodents, such as pocket mice and kangaroo rats, are the most commonly encountered. Of the 23 amphibian species that inhabit southeastern Arizona, spadefoot toads and true toads are dominant and the most widespread. Iguanid lizards, colubrid snakes, and whiptails are the most common reptiles in the area. The types of wildlife commonly occurring in Cochise County were presented in Appendix A of the Corridor EA (INS 2000), and is incorporated herein by reference.

Birds encountered during the April 2002 field survey were the black phoebe (*Sayornis nigricans),* raven (*Corvus cryptoleucus*), barn swallow (*Hirundo rustica)*, black-throated sparrow (*Amphispiza* bilineata), Scott's oriole (*Icterus parisorum*), English sparrow (*Passer domesticus*), Brewer's blackbird (*Euphagus cyanocephalus*), rufous hummingbird (*Selasphorus rufus*), crow (*Corvus brachyrhynchos*), Gambel's quail (*Callipepla gambelii*), Montezuma quail (*Cyrtonyx* montezumae), greater roadrunner (*Geococcyx californianus*), horned lark (*Eremophila alpestris*), house finch (*Carpodacus mexicanus*), mourning dove (*Zenaida macroura*), scaled quail (*Callipepla squamata*), Swainson's hawk (*Buteo swainsoni*), Vermillion flycatcher (*Pyrocephalus rubinus*), Wilson's warbler (*Wilsonia pusilla*), mallard (*Anas platyrhynchos*), golden eagle (*Aquila shrysaetos*), common raven (*Corvus corax*), ash-throated flycatcher (*Myiarchus cinerascens*), violet-green swallow (*Tachycineta thalassine*), and western kingbird (*Tyrannus verticalis*).

Mule deer (*Odocoileus hemionus*), jackrabbits (*Lepus californicus)* and ground squirrels (*Spermophilus* spp.) were the only mammals observed. Signs of cougar (*Felis concolor*) and coyotes (*Canis latrans*) were also recorded. Several reptiles were encountered including Sonoran coachwhip (*Masticophis flagellum cingulum*), and numerous whiptail lizards (*Cnemidophorus* sp.) and earless lizards (*Holbrookia* sp.).

3.7 AQUATIC COMMUNITIES

Distribution patterns of freshwater fish in Arizona are controlled by climatic and geological factors. The San Pedro River is considered as being both a perennial and intermittent stream based upon its location. The portion, which intersects the proposed project corridor, is classified as being an intermittent stream while the northern portion of the river is known as perennial. An intermittent stream is defined as a stream that flows only at certain times of the year; it may be wet or dry most of the time depending upon the weather. Historically, 13 native species of fish were present in the San Pedro River (Table 3-2). Of these species, only two remain in the streams: the longfin dace (*Agosia chrysogaster*) and desert sucker (*Catostomus clarki*). Most of the fish (14 species) currently present in the San Pedro River system are non-native species (USDOI 1989).

Whitewater Draw, which is another intermittent stream existing within the project corridor, trends north/south and does support habitat suitable for aquatic species at certain locations. However, no fish species were observed during the April 2002 survey. If fishes do occur within this area, they would most probably be the introduced mosquitofish (*Gambusia affinis*) and green sunfish (*Lepomis cyanellus*).

Table 3-2. Historic and Current Fish Species of the San Pedro River, Cochise County, Arizona

Native Fish	Scientific Name	Non-Native Fish	Scientific Name
Colorado River squawfish	*Ptychocheilus lucius*	black bullhead	*Ameiurus melas*
desert pupfish	*Cyprinodon macularius*	bluegill	*Lepomis macrochirus*
desert sucker	*Catostomus clarki*	brook trout	*Salvelinus fontinalis*
flannel-mouth sucker	*Catostomus latipinnis*	channel catfish	*Ictalurus punctatus*
Gila chub	*Gila intermedia*	common carp	*Cyprinus carpio*
Gila topminnow	*Poeciliopsis occidentalis*	fathead minnow	*Pimephales promelas*
loach minnow	*Tiaroga cobitis*	goldfish	*Carassius auratus*
longfin dace	*Agosia chrysogaster*	green sunfish	*Lepomis cyanellus*
razorback sucker	*Xyrauchen texanus*	largemouth bass	*Miropterus salmoides*
roundtail chub	*Gila robusta*	mosquitofish	*Gambusia affinis*
speckled dace	*Rhinichthys osculus*	rainbow trout	*Oncorhynchus mykiss*
spikedace	*Meda fulgida*	red shinner	*Cyprinella lutrensis*
Sonoran sucker	*Catostomus insignis*	threadfin shad	*Dorosoma petenense*
		yellow bullhead	*Ameiurus natalis*

Source: USDOI 1989.

3.8 UNIQUE OR SENSITIVE AREAS

Many unique natural areas that are found in relatively few places worldwide characterize the project region. Southeastern Arizona is an ecological crossroads, where habitats and species from the Sierra Madre of Mexico, the Rocky Mountains, and the Sonoran and Chihuahuan deserts converge. Ongoing efforts by many government agencies, as well as private entities, have set aside millions of acres for preservation and public use. Most of these consist of riparian (riverbank) areas, basin wetlands, scenic canyons, and vast desert areas. Unique and sensitive areas do exist in the project corridor. In particular, the Coronado National Memorial, the Coronado National Forest and the San Pedro Riparian NCA are located in the western reaches of the project corridor (Figure 3-5) and are discussed in the following paragraphs.

3.8.1 San Pedro National Conservation Area

The San Pedro Riparian NCA encompasses over 56,500 acres of riparian habitat, which serves as the link between a perennial supply of water, and the terrestrial habitats of the San Pedro River basin. Over 40 miles of this riparian habitat has been set aside by BLM to preserve the last remnants of desert riparian ecosystem, which was once vast in the southwest (Great Outdoor Recreation Pages 2000). In fact, the San Pedro River is one of the last free-flowing rivers in the southwest, and is one of the most extensive and ecologically valuable riparian ecosystems remaining.

The Nature Conservancy (TNC) claims that the diversity of birds, mammals, and reptiles along the San Pedro River is unequalled in the U.S. In fact, TNC has named the river as one of the “Last Great Places” in the western hemisphere (TNC 2000).

The San Pedro Riparian NCA is managed by the BLM, which has established conservation goals to protect and enhance the riparian ecosystem along the San Pedro River. BLM currently allows public use where natural resources would not be significantly impacted.

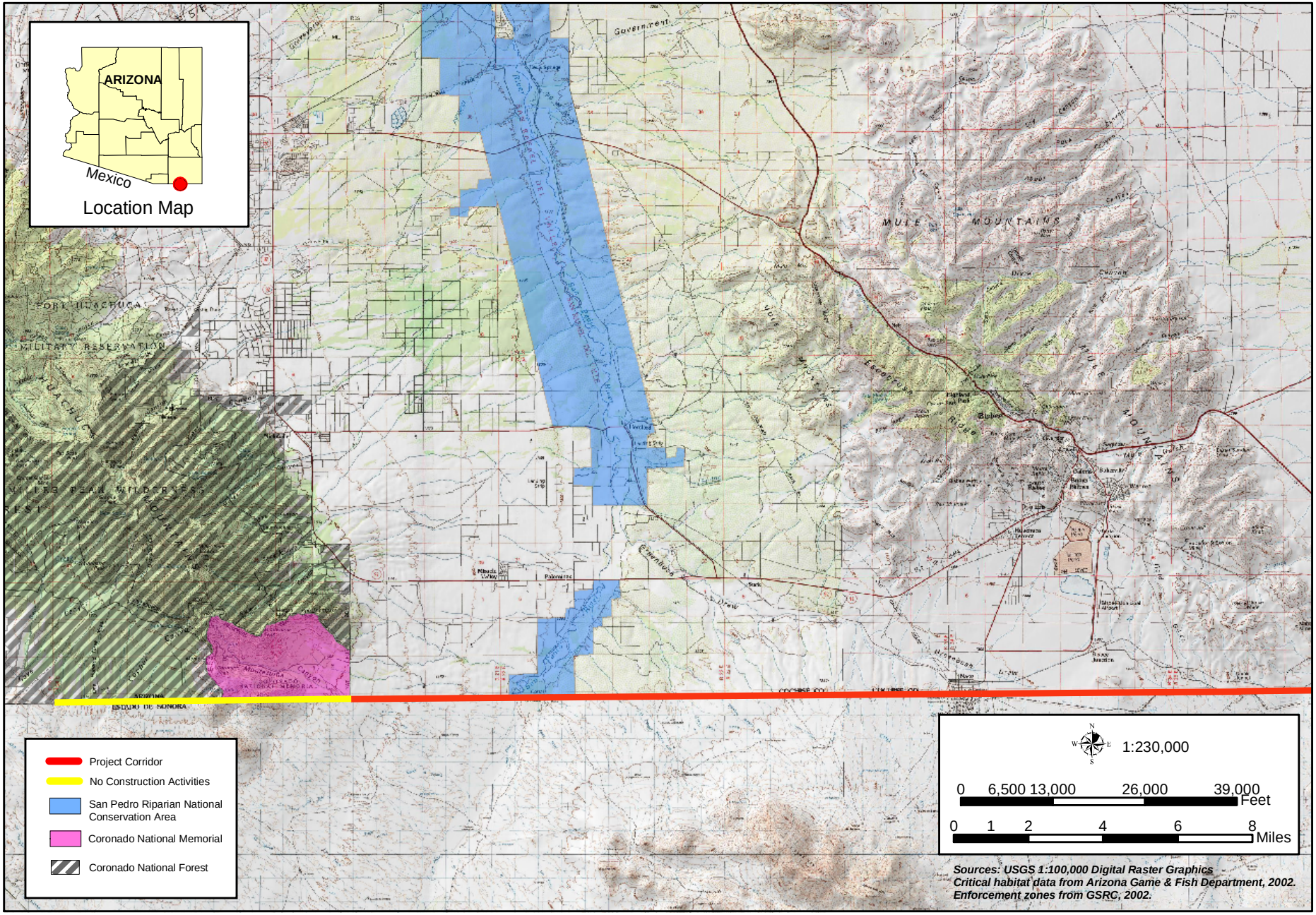

Figure 3-5: Unique and Sensitive Areas in the Project Corridor

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The biological diversity in the San Pedro Riparian NCA is vast, and therefore is its most valued aspect. Currently over 350 species of birds, 80 species of mammals, and 40 species of amphibians and reptiles inhabit the San Pedro Riparian NCA (Friends of the San Pedro River 2000).

3.8.2 Coronado National Memorial

This 4,976-acre national memorial commemorates the entry of the Spanish explorer Don Francisco Vasques de Coronado to southern Arizona from Mexico in 1540. The memorial park offers several trails with various levels of difficulty to accommodate all visitors. Visitors to the park are afforded sweeping views of mountainsides and deep valleys from atop Montezuma's Pass, which is at an elevation of 6,757 feet msl.

This vista provides spectacular views of both the San Pedro River Valley and the San Rafael Valley. In addition, the 780-mile Arizona Trail, which bisects the entire state, south to north, begins here at the Mexican border. Also, Coronado Cave offers a rare chance to explore subterranean expanses as well (Coronado National Memorial 2000).

3.8.3 Coronado National Forest

This national forest encompasses 1,780,000 acres of southeastern Arizona and southwestern New Mexico. Elevations range from 3,000 feet to 10,720 feet in 12 widely scattered mountain ranges. The Coronado National Forest, which is administered by the USFS, offers a wide variety of recreational opportunities to the public year round. In fact, recreation is one of their top priorities. Recreational uses are supported by over 1,100 miles of trails, four small lakes, and eight wilderness areas within the Coronado National Forest (USFS 2002).

3.9 PROTECTED SPECIES AND CRITICAL HABITAT

The Endangered Species Act (ESA) [16 U.S.C. 1531 et. seq.] of 1973, as amended, was enacted to provide a program for the preservation of endangered and threatened species and to provide protection for the ecosystems upon which these species depend for their survival. All Federal agencies are required to implement protection programs for designated species and to use their authorities to further the purposes of the act. Responsibility for the identification of a threatened or endangered species and

development of any potential recovery plan lies with the Secretary of the Interior and the Secretary of Commerce. The USFWS is the primary agency responsible for implementing the ESA.

The ESA also calls for the conservation of what is termed Critical Habitat - the areas of land, water, and air space that an endangered species needs for survival. Critical habitat also includes such things as food and water, breeding sites, cover or shelter, and sufficient habitat area to provide for normal population growth and behavior. One of the primary threats to many species is the destruction or modification of essential habitat by uncontrolled land and water development.

3.9.1 Federally Listed Species

A total of 27 Federally listed endangered, threatened, proposed threatened, proposed endangered, and candidate species occur within Cochise County, Arizona (USFWS 2002 and 2003). Table 3-3 includes 13 species listed as endangered, nine as threatened, one as proposed endangered, one as proposed threatened, and three as candidate.

Coordination with USFWS for this SEA can be found in Appendix B. Past coordination for this project corridor can be found in the EA for JTF-6 Proposed Fence and Road Improvement Project, Naco, Cochise County, Arizona (USACE 2000) and the Corridor EA (INS 2000).

Protected species that could be potentially affected by the proposed project include the Mexican spotted owl (*Strix occidentalis lucida*), lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*), Huachuca water umbel (*Lilacopsis schaffneriana* ssp. *recurva*), Chiricahua leopard frog (*Rana chiricahuensis*), Gila chub (*Gila intermedia*), Gila topminnow, spikedace, and loach minnow. Critical habitat for the following species could be potentially affected by the proposed project: Mexican spotted owl, spikedace and loach minnow, and Huachuca water umbel. Occurrences and Critical Habitat designations for the above-mentioned species are found on Figure 3-6.

Table 3-3 Federally Listed, Proposed, and Candidate Species Potentially Occurring within Cochise County, Arizona

Common/Scientific Name	Federal Status	Date Listed	Designated Critical Habitat	Habitat Requirements
AMPHIBIANS				
Chiricahua leopard frog *Rana chiricahuensis*	T	6/13/02 50 FR 40791	NA	Streams, rivers, backwaters, ponds, and stock tanks
Sonora tiger salamander *Ambystoma tigrinum stebbinsi*	E	1/6/97 62 FR 665	NA	Stock tanks and impounded cienegas in San Rafael Valley, Huachuca Mountains
BIRDS				
Bald eagle *Haliaeetus leucocephalus*	T	7/12/95 60 FR 35999	NA	Large trees or cliffs near water (reservoirs, rivers, and streams) with abundant prey
California brown pelican *Pelecanus occidentalis californicus*	E	10/16/70 35 FR 16047	NA	Coastal land and islands; Arizona lakes and rivers
Cactus ferruginous pygmy-owl *Glaucidium brasilianum cactorum*	E	3/10/97 62 FR 10730	NA	Mature cottonwood/willow, mesquite bosques, and sonoran desertscrub
Mexican spotted owl *Strix occidentalis lucida*	T	4/11/91 56 FR 14678	2/1/01 66 FR 8530	Old growth forest associated with steep canyons
Mountain plover *Charadrius montanus*	PT	2/16/99 64 FR 7587	NA	Open arid plains, short-grass prairies, and cultivated forms
Northern aplomado falcon *Falco femoralis septentrionalis*	E	1/25/86 51 FR 6686	NA	Desert grasslands
Southwestern willow flycatcher *Empidonax traillii extimus*	E	2/27/95 60 FR 10694	NA	Dense riparian vegetation
FISHES				
Beautiful shiner *Cyprinella formosa*	T	8/31/84 49 FR 34490	8/13/84 49 FR 34490	Deep pools in creeks, scoured areas of cienegas, and other stream-associated quiet waters
Gila chub *Gila intermedia*	PE	8/9/02 67 FR 40789	NA	Pools, springs, cienegas, and streams
Loach minnow *Tiaroga cobitis*	T	10/28/86 51 FR 39468	3/8/94 59 FR 10898	Lower San Pedro River has been designated as critical Habitat by USFWS
Spikedace *Meda fulgida*	T	7/1/86 51 FR 23769	2/25/00 65 FR 24327	Lower San Pedro River has been designated as critical habitat by USFWS
Yaqui catfish *Ictalurus pricei*	T	8/31/84 49 FR 34490	8/13/84 49 FR 34490	Moderate to large streams with slow current over sand and rock bottoms
Yaqui chub *Gila purpurea*	E	8/31/84 49 FR 34490	8/13/84 49 FR 34490	Deep pools of small streams, pools, or ponds near undercut banks

Common/Scientific Name	Federal Status	Date Listed	Designated Critical Habitat	Habitat Requirements
Yaqui topminnow *Poeciliopsis occidentalis sonoriensis*	E	3/11/67 32 FR 4001	NA	Streams, springs, and cienegas between 4,000 - 5,000 feet elevation, primarily in shallow areas
INVERTEBRATES				
Huachuca springsnail *Pyrgulopsis thompsoni*	C	NA	NA	Aquatic areas, small springs with vegetation slow to moderate flow
MAMMALS				
Black-tailed prairie dog *Cynomys ludovicianus*	C	NA	NA	Burrows in plains and grassland habitats
Jaguar *Panthera onca*	E	7/22/97 62 FR 39147	NA	Variety of habitats including lowland wet habitats and typically swampy savannas
Lesser long-nosed bat *Leptonycteris curasoae yerbabuenae*	E	9/30/88 53 FR 38456	NA	Desertscrub habitat with columnar cacti and agave present as food plants
Mexican gray wolf *Canis lupus baileyi*	E	3/11/67 32 FR 4001	NA	Chapparal, woodland, and forested areas. May cross desert areas
Ocelot *Leopardus pardalis*	E	7/21/82 47 FR 31670	NA	Humid tropical and sub-tropical forests, savannas, and semi-arid thornscrub
PLANTS				
Canelo Hills ladies' tresses *Spiranthes delitescens*	E	1/6/97 62 FR 665	NA	Finely grained, highly organic, saturated soils of cienegas
Cochise pincushion cactus *Coryphantha robbinsorum*	T	1/9/86 51 FR 952	NA	Semidesert grassland with small shrubs, agave, other cacti, and grama grass
Huachuca water umbel *Lilaeopsis schaffneriana* ssp. *recurva*	E	1/6/97 62 FR 665	7/12/99 64 FR 37441	Cienegas, perennial low gradient streams, wetlands
Lemmon fleabane *Erigeron lemmonii*	C	NA	NA	Crevices, ledges, and boulders in canyon bottoms in pine-oak woodlands
REPTILES				
New Mexico ridge-nosed rattlesnake *Crotalus willardi obscurus*	T	4/4/78 43 FR 34479	8/4/78 43 FR 34476	Presumably canyon bottoms in pine-oak and pin-fir communities

Sources: USFWS 2002,USFWS 2003 (Updated February 17, 2003)

Legend: E = Endangered PE = Proposed Endangered C = Candidate PT = Proposed Threatened T = Threatened

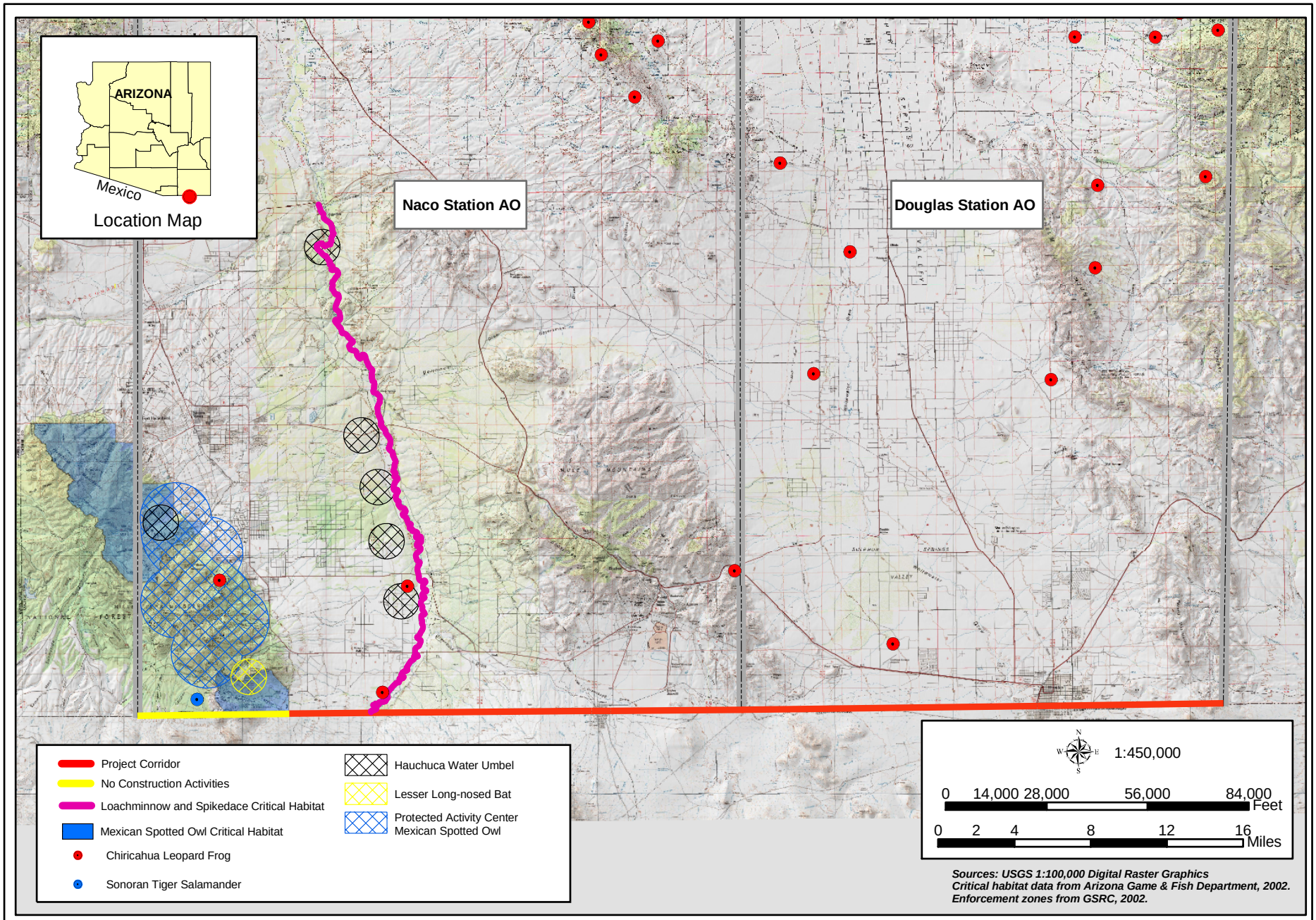

Figure 3-6: Critical Habitat and Occurance Locations in the Project Corridor

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3.9.1.1 Chiricahua Leopard Frog

Habitat for the Chiricahua leopard frogs includes rocky streams with deep rock-bound ponds, river overflow pools, oxbows, permanent springs, stock tanks, and ponds (INS 2002e). The riparian habitat along these water bodies generally consist of oak and mixed oak and pine woodlands, but it can also range into areas of chaparral, grassland, and even desert.

The Chiricahua leopard frog was listed as a threatened species on July 15, 2002. The Chiricahua leopard frog has been documented within the Naco Station's AO along the San Pedro River, approximately 2 miles north of the project corridor.

Additionally, the species is known to occur within the Huachuca Mountains along the southwestern portion of the AO, as well as, in the Dragoon Mountains near the northeastern boundary of the station and in the Mule Mountains in the southeastern corner of the Naco Station's AO (Figure 3-6). Observations of the Chiricahua leopard frog has also been documented in several areas within the Douglas Station AO (Figure 3-6). However, only one location, located northeast of Paul Spur, is recorded in the southern portion of the Douglas Station's AO, approximately 4 miles north of the project corridor.

Historical accounts of the frog occurring north of the project corridor has been identified in the Biological Assessment for the USBP Tucson Sector (INS 2002e) currently under informal consultation with the USFWS; JTF-6 Proposed Fence and Road Improvement Project, Naco, Cochise County, Arizona (USACE 2000); and the Corridor EA (INS 2000).

3.9.1.2 Lesser Long-nosed Bat

The lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) was listed as an endangered species in 1988, with no critical habitat designation. The range of the lesser long-nosed bat exists from "southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador" and occurrences in southern Arizona range from "the Picacho Mountains southwest to the Agua Dulce Mountains, southeast to the Chiricahua Mountains" (INS 2002e). Lesser long-nosed bats migrate from Arizona to Mexico in September and October, where they breed and spend the winter. They then return to Arizona as early as April to bear young. Females form maternity colonies

that may number in the hundreds or thousands, and males form smaller colonies. After the young are weaned, the maternity colonies begin to disband in July and August, but some bats remain in these roosts into October (INS 2002e). These bats are capable of overnight foraging flights of up to 40 miles from roost sites. The lesser long-nosed bats' diet consists of nectar and pollen from flowers of columnar cacti (e.g. saguara cactus and organ pipe cactus) in early summer and agave later in the summer and early fall. They may also feed on ripe cactus fruits at the end of the flowering season (INS 2002e).

The lesser long-nosed bat's preferred plant community is described as palo verde/saguaro, semi-desert grassland, and oak woodland. Although the project corridor does not directly affect a known roost site, their habitats, roosting areas, and feeding requirements were evaluated. According to field observations from a survey conducted in April 2002, several species of agave were found within the project corridor.

Lesser long-nosed bats have been documented roosting in the State of Texas Mine within the Huachuca Mountains (see Figure 3-6). The State of Texas Mine located to the southeast of Fort Huachuca is the only known roost site located within the Naco and Douglas Stations' AOs. This location is not considered a maternity roost site. However, because possible food sources for foraging lesser long-nosed bats do exist in the project corridor, the potential for foraging bats to occur in the project corridor exists from the Texas Mine roost site, east approximately 17 miles into the Douglas Station's AO.

3.9.1.3 Mexican Spotted Owl

The Mexican spotted owl (*Strix occidentalis lucida*) was listed as Federally threatened on March 16, 1993, final designation for critical habitat became effective on March 5, 2001. Nesting occurs in canyons and older forests of mixed-conifer or ponderosa pine (*Pinus ponderosa*)/Gambel's oak (*Quercus gambelii*) with a multi-layered foliage structure, usually at elevations between 4,100-9,000 feet. In southern Arizona, Madrean pine-oak forests are also commonly used for habitat (INS 2002e).

The Basin and Range – West Recovery Unit for the Mexican spotted owl is located in the Huachuca Mountains, which is in the Naco Station's AO. The Protected Activity Center and critical habitat of the Mexican spotted owls within the Huachuca Mountains were presented previously on Figure 3-6.

3.9.1.4 Spikedace and Loach Minnow

The spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*) were both listed as a Federally threatened species in 1986. Critical habitat designations for both species were approved on April 25, 2000. The spikedace and loach minnow occupy similar habitat, consisting of medium to large perennial streams within shallow riffles with moderate to swift currents and swift pools with sand, gravel, and rubble substrates. They inhabit shear zones where rapid-flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars; and eddies at downstream riffle edges. Recurrent flooding is required to maintain spikedace habitat and to provide the species with a competitive advantage over non-native aquatic species.

The spikedace's (*Meda fulgida*) range includes Aravaipa Creek, a tributary of the San Pedro River, Eagle Creek, and the Upper Verde River system in Arizona. Historically, this species was found in the San Pedro River near Charleston Pass, Arizona. The spikedace was formerly widespread in the Gila basin, but populations have decreased in its range. The spikedace occupies midwater habitats of runs, pools, and swirling eddies in shallow water (AGFD 2001d).

The loach minnow (*Tiaroga cobitis*) was historically endemic to the Gila River basin near and upstream of Phoenix, and included the Agua Fria, Gila, Salt, San Pedro, and Verde River systems in Arizona. The loach minnow's range has been drastically reduced and fragmented because of habitat destruction, competition, and predation by introduced fish species. Typical habitat for this species is turbulent, rocky riffles of mainstream rivers and tributaries. It prefers moderate to swift current and gravel or cobble substrates sometimes associated with dense, filamentous green algae (AGFD 2001e).

Critical habitat designations for the spikedace and loach minnow are found within the San Pedro River, which is located within the project corridor in the Naco Station's AO (see Figure 3-6).

3.9.1.5 Huachuca Water Umbel

Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*) was listed as an endangered species in 1997 with critical habitat designated at this time. The Huachuca water umbel is know to occur in the Huachuca Mountains, and the San Pedro River

area, in Cochise County, Arizona (Figure 3-6). Both the San Pedro River and the Huachuca Mountains are located within the Naco Station's AO.

According to the AGFD, Huachuca water umbel habitat is described as cienegas and associated vegetation within Sonoran desertscrub, grassland or oak woodland, and conifer forest (AGFD 1997). It requires perennial water, gentle stream gradients, small to medium sized drainage areas, and mild winters. It is usually found in water depths averaging from 2 to 16 inches. Optimum substrate consists of submerged sand, mud and/or silt. Habitat elevation ranges from 4,000 to 6,500 feet msl.

The Huachuca water umbel is found throughout southeastern Arizona with historical locations such as the Huachuca Mountains, San Pedro River, Saint David (extirpated), and San Bernadino Valley/Black Draw areas within Cochise County. The San Pedro Riparian NCA is the chief location for this plant on BLM land with most plants located along the San Pedro River approximately 5 miles north of the project corridor. The Huachuca water umbel seems to be naturally re-colonizing the San Pedro River at several locations including the Highway 90 crossing and Boquillas Ranch.

3.9.1.6 Gila Chub

The Gila chub (*Gila intermedia*) was historically found in headwater streams of the Gila River drainage in Arizona and in the San Pedro River system. This species currently has a range within Arizona within the following drainages: Santa Cruz River, Middle Gila River, San Pedro River, Agua Fria River, and Verde River. The Gila chub is normally found in the smaller headwater streams, cienegas, springs and marshes of the Gila River basin. (AGFD 2001b) They normally prefer deep pools with heavily vegetated overbanks and vegetated backwaters.

3.9.1.7 Gila Topminnow

The Gila topminnow (*Poesiliopsis occidentalis occidentalis*) is presently found in several localities of the Gila River drainage in Arizona, and one locality in the Bill Williams River drainage in western Arizona. This species is known to occupy headwater springs, vegetated margins, and backwater areas of intermittent and perennial streams and rivers. The Gila topminnow prefers shallow warm water in a moderate current with dense vegetation and algae mats (AGFD 2001c).

No evidence of Federally listed threatened or endangered species were found within the survey corridor during the biological survey in April 2002, or during past surveys (INS 2000; USACE, 1994, 1996).

3.9.2 Critical Habitat

Critical habitat has been designated for eight species identified as potentially occurring in Cochise County, Arizona (USFWS 2000; ADFG 2000). Two of these designations fall within the project corridor and are located in the Naco Station's AO. Figure 3-6, shown previously, provided the location of designated critical habitat within the project corridor.

The critical habitat of the Mexican spotted owl, which occurs within the project corridor, was designated by the USFWS on February 1, 2002 (66 FR 8530-8553). Primary constituent elements are provided in canyons and mixed conifers, pine-oak, and riparian habitat types that typically support nesting and/or roosting.

The USFWS has designated seven areas (complexes) as critical habitat for the spikedace and loach minnow in Arizona and New Mexico (50 CFR 17.95(e)). Only Complex 5 is located within the project corridor. Complex 5 includes that portion of the San Pedro River beginning at the U.S. border with Mexico and extending upstream approximately 37.2 miles to the confluence with the Babocomari River.

3.9.3 State Listed Species

The AGFD maintains lists of Wildlife of Special Concern (WC). This list includes fauna whose occurrence in Arizona is or may be in jeopardy or with known or perceived threats or population declines (AGFD 2003). These species are not necessarily the same as those protected by the Federal government under the ESA. A list of all State protected species occurring in Cochise County, Arizona is provided in Appendix C.

The Arizona Department of Agriculture maintains a list of protected plant species within Arizona. The 1993 Arizona Native Plant Law defined five categories of protection within the state. These include: Highly Safeguarded (HS), no collection allowed; Salvage Restricted (SR), collection only with permit; Export Restricted (ER), transport out of state prohibited; Salvage Assessed (SA), permit required to remove live trees; and Harvest Restricted (HR), permit required to remove plant by-products (AGFD 2000).

There was no evidence or observation of any AGFD-listed flora or fauna in the project corridor during the survey conducted in April 2002. Species observed within the project corridor that are protected under the Arizona Native Plant Law include mesquite (SA, HR), sotol (SR), ocotillo (SR), cholla (SR), hedgehog cactus (HS, SR), Parry's agave (SR), and banana yucca (SR, HR). A Notice of Intent to Clear Land would be filed with the Arizona Department of Agriculture prior to the initiation of construction activities.

3.10 CULTURAL RESOURCES

3.10.1 Cultural Resources Overview

Cultural resources are extensive and diverse throughout the project corridor. There have been previous terrestrial investigations performed north of the U.S.-Mexico border in the Naco and Douglas Stations' AO, including sites within the project corridor. These previous investigations and their results, as well as a cultural chronology history of southern Arizona are discussed in detail in the 2000 Corridor EA (INS 2000) and in the EA for JTF-6 Proposed Fence and Road Improvement Project, Naco, Cochise County, Arizona (INS 2000). The cultural chronology, which is provided in the above-mentioned EAs, provides a broad overview prehistory in southern Arizona and is incorporated herein by reference. In order to evaluate impacts to cultural resources all properties that are or may be eligible for inclusion on the NRHP that could be impacted by an undertaking, need to be identified. For a property to be eligible for inclusion on the NRHP it needs to meet the National Register criteria, outlined in the Department of the Interior regulations at 36 CFR Part 60:

> The quality of significance in American History, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> **a)** *That area associated with events that have made a significant contribution to the broad patterns of our history; or*
> **b)** *That are associated with the lives of persons significant in our past; or*

c) *That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or*

d) *That have yielded, or may be likely to yield, information important in prehistory or history. [36 CFR § 60.4]*

If a property is not included on or eligible for inclusion in the NRHP, it is not a historic property for purposes of National Historic Preservation Act (NHPA) and does not need to be considered under Section 106 of the NHPA. The following discussions summarize previous and current cultural resources investigations that were performed in the project corridor. The investigations identified 17 newly and previously recorded sites within the project corridor that are considered eligible for listing in the NRHP.

3.10.2 Previous Investigations

Previous investigations conducted within or near the project corridor are discussed in the above referenced documents. A records check was conducted to identify previous cultural resource projects and cultural resource sites located within or adjacent to the project corridor. A total of 23 previously recorded archaeological sites were recorded within the 300-foot project corridor. Of these 23 locations, 13 have been determined eligible for the NRHP and 10 are ineligible for listing in the NRHP. Sites that have been determined ineligible for listing in the NRHP are not considered “historic properties” and are not afforded any additional protection. As a result, ineligible sites will not be discussed further in this report. Table 3-4 outlines the previously recorded archaeological sites within the 300-foot survey corridor. In addition there are 19 historic properties that are listed on either the NRHP and/or the State Register of Historic Places within one mile of the project corridor (ATZLAN 2002). These include archaeological sites, archaeological districts, historic structures, and historic districts (ATZLAN 2002).

3.10.3 Current Investigations

An additional investigation was required for the project corridor to assess potential impacts to cultural resources by the implementation of the action alternatives. This investigation involved walking transects throughout the project corridor and focused on

investigations within 300 feet north of the U.S.-Mexico border. The purpose was to identify and record any existing and potential sites, in addition to reinvestigating known existing sites located within the project corridor that are considered eligible or potentially eligible for inclusion to the NRHP. As a result of these surveys, four new archaeological sites were recorded. All 17 of the newly and previously recorded sites were determined to be eligible for inclusion on the NRHP (Aztlan 2002). Table 3-5 summarizes the newly recorded sites within the 300-foot corridor.

Table 3-5. Summary of Newly Recorded Sites

Site Number	Site Type	Eligibility Criteria
AZ EE:12:60	Prehistoric Mogollon Village	Eligible - D
AZ EE:12:61	Corral Complex	Eligible - A, C, D
AZ FF:11:101	Prehistoric Scatter, Mogollon	Eligible – D
AZ FF:11:105	U.S.-Mexico border	Eligible – A, C

Source: AZTLAN 2002

3.11 AIR QUALITY

Primary standards are established to protect public health while secondary standards provide protection for the public's welfare including wildlife, climate, recreation, transportation, and economic values. Based on measured ambient criteria pollutant data, areas are designated as having air quality better than the standard (attainment) or worse than the standard (no attainment).

States are required to adopt ambient air quality standards that are at least as stringent as the National Ambient Air Quality Standards (NAAQS); although, the state standards may be more stringent. However, the State of Arizona has adopted the NAAQS (40 CFR Part 50) as the state's air quality criteria (Table 3-6).

With the exception of Paul Spur and Douglas, all of Cochise County is in attainment for all NAAQS. The Clean Air Act (CAA) requires that for areas designated "non-attainment", plans must be prepared and implemented to bring the area into attainment within a specified time.

Table 3-6: National Ambient Air Quality Standards

Pollutant	Standard Value	Standard Type
Carbon Monoxide (CO)		
8-hour average	9ppm (10mg/m^3)**	Primary
1-hour average	35ppm (40mg/m^3)**	Primary
Nitrogen Dioxide (NO_2)		
Annual arithmetic mean	0.053ppm (100µ/m^3)**	Primary and Secondary
Ozone (O_3)		
1-hour average*	0.12ppm (235µg/m^3)**	Primary and Secondary
8-hour average*	0.08ppm (157µg/m^3)**	Primary and Secondary
Lead (Pb)		
Quarterly average	1.5µg/m^3	Primary and Secondary
Particulate<10 micrometers (PM_{10})		
Annual arithmetic mean	50µg/m^3	Primary and Secondary
24-hour average	150µg/m^3	Primary and Secondary
Particulate<2.5 micrometers ($PM_{2.5}$)		
Annual arithmetic mean	15µg/m^3	Primary and Secondary
24-hour Average	65µg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)		
Annual arithmetic mean	0.03ppm (80µg/m^3)**	Primary
24-hour average	0.14ppm (365µg/m^3)**	Primary
3-hour average	0.50ppm (1300µg/m^3)**	Secondary

Source: USEPA 1995.
Legend: ppm = parts per million
mg/m^3 = milligrams per cubic meter of air
µg/m^3 = micrograms per cubic meter of air
*The ozone 1-hour standard applies only to areas that were designated non-attainment when the ozone 8-hour standard was adopted in July 1997.
**Parenthetical value is an approximate equivalent concentration.

The emissions responsible for the non-attainment designation are particulate matter less than 10 microns in diameter (PM_{10}) and sulfur dioxide (SO_2). The PM_{10} designation results from fugitive dust from unpaved roads, agricultural activities, and erosional forces of wind on agricultural land. The current State Implementation Plan (SIP), which is awaiting approval by the U.S. Environmental Protection Agency (USEPA) for attainment, indicated that 60 percent of the PM_{10} in the Douglas area originates in Mexico (Arizona Department of Environmental Quality [ADEQ] 2002).

The SO_2 designation is a result of a copper smeltering plant that was dismantled in late 1987. The ADEQ has submitted a SIP to the USEPA showing reasonable further progress and has requested re-designation to attainment (ADEQ 2001).

Detailed information on air quality within the project corridor can be found in the Corridor EA (INS 2000) and the EA for JTF-6 Proposed Fence and Road Improvement Project,

Naco, Cochise County, Arizona (USACE 2000). An air quality impact and conformity analysis was prepared in support of this document. The analysis report is included in Appendix D. Potential impacts identified in that report are summarized in Section 4.11 of this SEA.

3.12 WATER RESOURCES

The project corridor receives water from surface runoff and groundwater via precipitation and snowmelt in the local mountains. Geologic forces have created a regional terrain that includes arroyos or washes (deep gullies), steep canyons, and somewhat flat basins. Due to the arid climate of southern Arizona, most of the drainage channels and floodplains are dry for much of the year. Rivers and streams that flow periodically due to fluctuations in precipitation are referred to as being ephemeral. The vast majority of the drainages that transect the project corridor are considered ephemeral drainages. Due to the flash flood tendency of these washes, sediment loads are high when water is present.

3.12.1 Surface Watersheds

The project corridor is located within three major surface watersheds, which influence the groundwater resources. Depicted in Figure 3-7, these watersheds include the Upper San Pedro basin, Whitewater Draw, and the Rio Yaqui.

3.12.1.1 Upper San Pedro Basin

Much of the project corridor lies within the San Pedro River Valley, which serves as a major surface water drainage influencing the project corridor. The San Pedro River, which starts in the desert grasslands of northern Sonora, Mexico, flows northward for 140 miles into the Gila River near Lineman, Arizona (USDOI 1989). The San Pedro River is the largest un-dammed river in the southwest.

The San Pedro basin is characterized by two separate basins (upper and lower). The project corridor is located within the Upper San Pedro basin. The total area within Arizona encompassed by this basin is approximately 1,875 square miles (Figure 3-7).

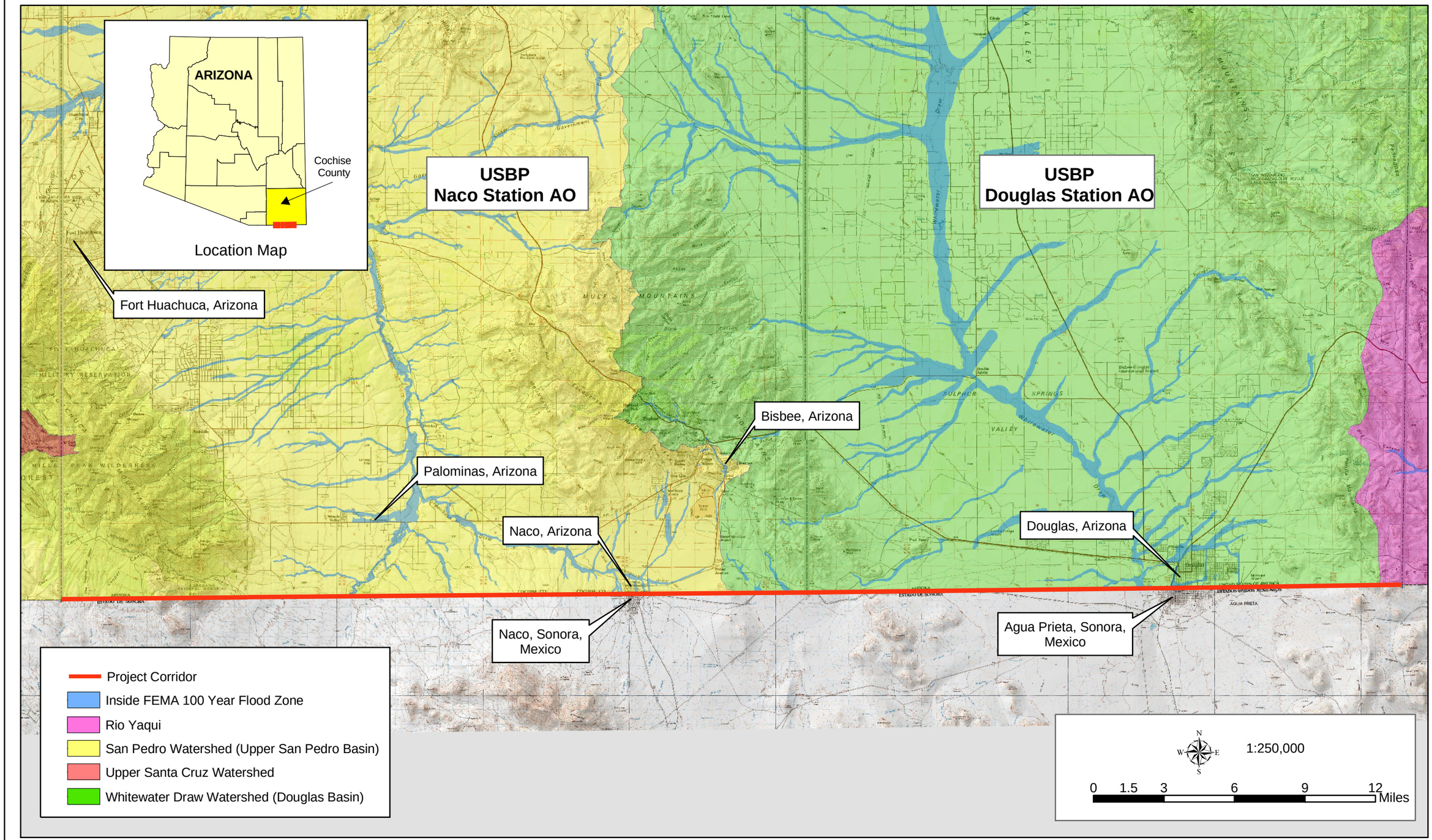

Figure 3-7: Naco/Douglas Project Corridor
Water Resources

Sources: USGS 1:100,000 Digital Raster Graphics
Water Resources from ANDWAR.
Project area data from GSRC, 2002.

GSRC GULF SOUTH RESEARCH CORPORATION

Date: May 2003

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Like all sub-drainages within this basin, the San Pedro River is mostly ephemeral over much of its reach, meaning it flows during portions of the year (Arizona Department of Water Resources [ADWR] 2002).

Seepage studies conducted by the U.S. Geological Survey (USGS) during 1969 and 1970 indicated that the San Pedro River looses 1.7 cubic feet per second (cfs) stream flow due to infiltration to the alluvial aquifer between the U.S.-Mexico border and Palominas, Arizona. The river then gains 8.5 cfs (stream flow is increased by groundwater discharge) from Palominas to Charleston, and then loses 0.4 cfs from Charleston to the mouth of the Babocomari River near Fairbank (Freethey 1982).

Groundwater supports base flow in the San Pedro River from both sides of the basin in the upper reaches (Palominas and Sonora, Mexico, etc.), but southward most of the recharge supporting base flow originates in the Mule Mountains on the east side of the basin (Pool and Coes 1999).

The gains and losses suggest that there are surface and groundwater withdrawals in the Palominas area and in Mexico, probably for mining and agricultural purposes that are influencing stream flow near the U.S.-Mexico border. The stream losses near Fairbank may reflect the large cones of depression resulting from groundwater withdraw at Fort Huachuca and Sierra Vista.

Another possible factor that may be reducing the base flow of the San Pedro is the increasing area of the entrenchment alluvium (unconsolidated soil in the upper alluvium of the stream bed). A series of large floods, perhaps beginning as early as 1881 eventually lead to the entrenchment of a channel 3 to 35 feet below the former floodplain. Prior to these events, the San Pedro River flowed in a shallow narrow channel in inner valley terrace deposits accumulated between A.D. 1450 and 1900. During this period, the river was a relatively sluggish, low-energy fluvial system with extensive marshy reaches and a high water table (Hereford 1993).

The cause of flooding around 1890 is poorly understood but is probably related to extensive wood cutting for mine timber and fuel, the introduction of large cattle herds, and unusually heavy rainfall (Hereford 1993). The entrenchment alluvium acts as a very

large drain pipe buried just below the bottom of the channel that short-circuits surface flow downstream to the end of the entrenchment alluvium. If there was a large volume of base flow, this short-circuiting may not be important; but, when base flow is small it can be a direct cause of reduced flow and extended no-flow periods in that reach of the river and upstream. This drainpipe effect is greatest between the Town of Hereford and the Lewis Springs-Palominas areas.

3.12.1.2 Whitewater Draw

Another major surface water drainage intersecting the project corridor is Whitewater Draw (see Figure 3-7), located just west of Douglas, and is a component of the Douglas basin. Whitewater Draw is ephemeral over most of its reach and only flows in association to local rainfall (ADWR 2002). Whitewater Draw flows southward and receives some discharge from the Douglas wastewater treatment plant near the border. The Douglas basin, which supplies water to the Whitewater Draw surface watershed, encompasses about 750 square miles. It is part of a northwest to southeast trough that extends from the Aravaipa Canyon to the northeastern portion of Sonora, Mexico.

3.12.1.3 Rio Yaqui

A minor part of the eastern most portion of the project corridor is the San Bernardino Valley basin, which feeds the Rio Yaqui surface watershed. Figure 3-7 depicted the major watersheds, drainages, and floodplains that influence this portion of the project corridor.

3.12.2 Groundwater Resources

Groundwater resources are available from both water table and artesian aquifer conditions. Groundwater is collected in the streambed alluvium and sediments that fill the valley areas. The basin is fed by direct rainfall and groundwater that follows faults and existing bedrock from the adjacent mountains. The direction of flow generally follows the surface flow northwesterly with the riverbed. There are two basins located within the project area, the Upper San Pedro basin and the Douglas basin. These basins are located within the Basin and Range Physiographic Province. The principal source of water for the Town of Naco and the nearby town of Bisbee was designated as a Sole Source Aquifer (SSA) by the USEPA on September 03, 1988 (53 CFR 38337) under Section 1424(e) of the Safe Drinking Water Act. The USEPA defines a sole or

principal source aquifer as “one which supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. These areas can have no alternative drinking water source(s) which could physically, legally, and economically supply all those who depend upon the aquifer for drinking water” (USEPA 2002).

The main use for groundwater in Cochise County is pumped irrigation. Other uses include public and industrial/mining. Most irrigation wells are located in the highly permeable streambed alluvium. Most industrial and domestic/public supply wells are located in the regional basin-fill aquifer (ADWR 2002).

3.12.2.1 Upper San Pedro Basin

The Upper San Pedro basin is an intermontaine valley of about 1,875 square miles bounded on the west by the Huachuca, Whetstone, and Rincon Mountains, and on the east by the Mule, Dragoon, Little Dragoon, and Winchester Mountains (Barnes 1997). About 72 percent (1,175 square miles) lie within the U.S., mostly within Cochise County. The remaining 28 percent (700 square miles) lies within Mexico. The Upper San Pedro basin is a north-south trending trough formed by the uplift of the surrounding mountain blocks relative to the underlying valley floor. The mountain blocks are highly faulted and fractured and are composed of Precambrian to Tertiary crystalline granitic and metamorphic, volcanic, and consolidated sedimentary rock formations.

One of the largest water users in the San Pedro basin are the trees and shrubs growing in the alluvium along the San Pedro River. As part of the Semi-Arid Land-Surface-Atmosphere (SALSA) program, remote sensing was used to determine changes in habitat over a large part of the Upper San Pedro basin during the period of 1974 to 1987. It was determined that during this 13-year period, there was a 35 percent decrease in grasslands, an 11 percent increase in desert shrubs and a 50 percent increase in woodlands (Kepner et. al 1995). Reasons for this change vary; yet, it has been noted that after the 1880 entrenchment occurred, the channel of the San Pedro River widened removing grassland soils. Once the sod was broken, trees and shrubs had less competition and crowded out the grass (Todd 1959). Using field checking, Landsat satellite imagery, and multi-altitude aircraft sensors it was determined that 52 percent of the Upper San Pedro River corridor is composed of cottonwood, mesquites, and sacaton grasses. The evapotranspiration rates from these three types of vegetation

communities (i.e., forested areas, desert scrub, and grasslands) were estimated to be 3.52, 33.8, and 1.86 ac-ft per day, respectively. The daily evaporative water loss for the entire riparian corridor was estimated to be 30.7 ac-ft per day. This suggests that vegetation along the San Pedro River use approximately 11,205 ac-ft/year (Qi et al 1998).

The total available groundwater in storage in the Upper San Pedro basin varies from source to source, and year to year, which is generally revised downward. In 1990, the ADWR estimated that there was 56,700,000 ac-ft of water in aquifer storage (ADWR 1990). A more recent Water Resources Inventory conducted for Cochise County, however, estimated that the total water in storage in the Upper San Pedro basin is 40,400,000 ac-ft (EEC 2002), all of which is contained within the Upper and Lower basin fill, unconfined to confined aquifer.

Recharge originates as rainfall from the two distinct rainy seasons in southeastern Arizona; a low intensity rainy season during the winter months and the summer "monsoon". Winter precipitation at Tombstone, Arizona from 1897 through 1997 averaged 3.2 inches (1 to 8 inches), and the summer wet-season precipitation averaged 9.6 inches (4 to 16 inches) (Pool and Coes 1999). Recharge occurs primarily during the winter season (Scott et. al 1998). Recharge reaches the water table and becomes groundwater flow that moves down gradient to points of discharge (pumping, stream flow, etc). In the Upper San Pedro basin, the base flow is apparently cyclic. Data observed from the USGS's gage at Palominas for 1995 through 2002, suggests that the cyclic discharge trend has been on an increasing trend. While this 6 to 7 year trend represents a positive factor in increasing recharge, it only reflects a temporary change and could decrease in the future.

Based on data provided in the Cochise County Water Resources Inventory, the average annual recharge is 29,744 ac-ft (EEC 2002). Determining an accurate total withdrawal from the system is difficult; however, an ADWR flow model suggested that during 1990 the total withdrawal (i.e., pumpage, evapotranspiration, and outflow) was 18,000 ac-ft (Corell et.al 1996). Inflow from Mexico contributes an average of 900 ac-ft/year (ADWR 1990). The recharge plus the inflow from Mexico equals 30,644 ac-ft (29,744 plus 900 ac-ft). These factors result in a surplus of recharge of 12,644 ac-ft/year. This surplus is

primarily the water that maintains vegetation and seasonal flow in the Upper San Pedro River. The result suggests that the Upper San Pedro basin experiences an annual surplus of approximately 1,439 ac-ft/year. However, a surplus is unlikely since a significant gap in these data is the lack of available irrigation use data. Irrigation for agriculture can and most likely uses a significant amount of water. In fact, in a 1998 report prepared by the Center for Environmental Cooperation (CEC), a ground water budget for the U.S. portion of the Upper San Pedro River basin was reported at approximately 7,400 ac-ft/year deficit and a 12,670 ac-ft/year deficit was estimated by the year 2030 if conservation measures are not incorporated (CEC 1999). While data provided in this report included consumptive uses such as wells and irrigation, it must be noted that the data were intended as estimates and the actual deficit is unknown. Nevertheless, there is a consensus that the San Pedro Basin experiences an annual deficit to its recharge. Therefore, for the remainder of this SEA, a 7,400 ac-ft/yr deficit must be assumed.

There are 25 water utilities in the Upper San Pedro basin. The largest water users are associated with Fort Huachuca and Sierra Vista. Table 3-7 compares 1992 to 2000 pumpage from the major water utilities. Most of the water companies in the Upper San Pedro basin more than doubled their pumpage between the years 1992 and 2000. This was particularly true for water companies in the Fort Huachuca-Sierra Vista area. Such increases continuing into the future are undesirable when dealing with an essentially finite resource. The capture of surface water or groundwater anywhere in the basin affects the entire flow system. One desirable factor is that approximately 40% the water pumped by municipalities is put back into the system in one way or another; either by treated effluent discharged to a stream, discharged to a dedicated recharge system, put in ponds, sprayed on turf, etc.

3.12.2.2 Douglas Basin

The Douglas basin is located in the southeast corner of Cochise County and is contiguous to the east with the Upper San Pedro basin, and therefore, the two basins are closely related geologically and hydrologically. The mountains that bound the west side of the basin are the Dragoon and Mule Mountains (common watershed divide with the San Pedro basin to the west), and the Swisshelm, Pendregosa and Perilla Mountains to the east. The basin is drained by Whitewater Draw, a mostly ephemeral

Table 3-7. Water Company Pumpage and Treated Effluent in the San Pedro Basin

Company	Pumpage				Effluent
	1992		2000		2000
	(gal/yr)	(ac-ft/yr)	(gal/yr)	(ac-ft/yr)	(ac-ft/yr)
Fort Huachuca	926,982,936	**2,844.8**	600,502,478	**1,842.9**	**1,120**
Sierra Vista					**2,913**
Arizona Water Co.	579,913,200	**1,779.7**	644,743,400	**1,978.6**	
Bell Vista Water	971,086,000	**2,980.2**	1,048,444,570	**6,197.7**	
East Slope Water	63,361,000	**194.4**	82,481.820	**253.1**	
Pueblo del Sol Water	174,009,179	**534**	370,3000,000	**1,136.4**	
Naco	32,747,000	**100.5**	26,712,256	**82**	**56**
St. David	46,435,000	**142.5**	58,517,934	**179.6**	
Other 17 Water Co.'s	152,596,008	**468.3**	366,185,088	**1,123.8**	**1,073**
Total (ac-ft)		**9,044.4**		**12,794.1**	**5,162**

Source: EEC 2002

water course that flows southward and becomes the Rio de Aqua Prieta after it crosses the U.S. border into Mexico (Rascona 1993).

Groundwater is primarily available from the unconsolidated to poorly consolidated upper alluvial deposits and the aquifer is unconfined to semi-confined. Water level measurements in 1990 ranged from 38 feet below land surface near Whitewater Draw to 399 feet at the base of the Dragoon Mountains. Large capacity wells have produced as much 1,600 gallons/minute (gpm), but most produce less than 1,000 gpm. Southward flow out of the basin is estimated to be between 1000 to 5000 ac-ft/year (Freethey and Anderson 1986). Groundwater recharge in the upper alluvium occurs mainly in washes along the mountain fronts. Very little recharge is attributable to direct rainfall on the valley floor, or from seepage in irrigated areas (Coates and Cushman 1955). Prior to development, total annual recharge to the aquifers in the basin was estimated to be about 22,000 ac-ft/year (Freethey and Anderson 1986). The current recharge to the Douglas basin is estimated to be 14,490 ac-ft/year (EEC 2002).

Water levels have declined throughout the basin since 1966. Generally, declines since 1966 are greatest in the northern part of the basin and decrease southward toward the U.S.-Mexico border. However, local declines have been noted in the area around the City of Douglas. Water level declines at Douglas were 27 feet between 1978 and 1990 and 71 ft between 1966 and 1990. The City of Douglas has maintained a reasonably consistent amount of pumpage of about 3,000 ac-ft/year since 1966 (Rascona 1993).

A reduction in industrial pumping occurred in 1987 when the Phelps Dodge Corp. ceased their copper smelting operation. Phelps Dodge Corp. had pumped an average of 1,600 ac-ft/year since 1967 (Rascona 1993). Water levels in the Douglas area are likely decreasing because of population growth in the nearby City of Aqua Prieta in Mexico.

About 540 square miles of the Douglas basin has been declared an "irrigation non-expansion area", in response to the area being designated the "Douglas Critical Groundwater Area" in 1965. Groundwater withdrawals in the basin have been primarily for irrigation, with additional small amounts for industrial, stock, and domestic use. Total pumpage in the basin was estimated to be about 43,000 ac-ft during 1990 (EEC 2002).

Public water supplies in the Douglas basin have generally shown a significant increase (a 50% total) in pumpage between 1992 and 2000 (Table 3-8). Treated effluent discharged to local streams, recharged, or placed in ponds amounted to 638 ac-ft in the Douglas basin. In the Douglas basin, there is an estimated 22-million ac-ft of water in aquifer storage. According to data presented in the Cochise County Water Resources Inventory, recharge to the basin is estimated to be 14,490 ac-ft/year. Total pumpage in 1990 was estimated to be 43,000 ac-ft (ADWR 1993), plus about 2,500 ac-ft underflow to Mexico (Freethey and Anderson 1986). Therefore, these data suggest a deficit of 31,010 ac-ft/year.

Table 3-8. Water Company Pumpage and Treated Effluent in the Douglas Basin

Company	Pumpage			
	1992		2000	
	(gal/yr)	(ac-ft/yr)	(gal/yr)	(ac-ft/yr)
Clear Springs Utility	40,722,000	**125**	43,136,160	**132.4**
Coronado Estates	9,976,000	**30.62**	19,715,070	**60.50**
Naco	32,747,000	**100.5**	26,712,256	**82**
Elfrida Domestic Water Users Assoc.	15,664,000	**48.07**	38,050,493	**166.77**
Monte Vista Water	2,923,000	**8.97**	3,888,770	**11.93**
MWC	1,568,000	**4.81**	1,695,050	**5.20**
Total (ac-ft)		**217.5**		**326.8**

Source: EEC 2002

3.12.3 Floodplains, Waters of the U.S., and Wetlands

The project corridor is intersected by existing floodplains. These areas are either associated with the main channel of the San Pedro River or one of its tributaries and Whitewater Draw. Floodplains are low-lying areas adjacent to or within major watersheds that serve to contain excess water during rainfall events. Their limits are based on the amount of water that they can be stored during historic rainfall events. The 100-year flood is generally the standard utilized in management of these areas. This boundary is based on the elevation in which there is a one percent chance that floodwater would reach a designated limit during a rainfall event. Many factors may affect floodplain capacities. An example would be increased urban development that fills in floodplains and forces water into other areas. They can also be altered by excessive erosion into the floodplain. The Federal Emergency Management Agency (FEMA) is responsible for regulating these areas. Under 44 CFR 9, FEMA acts through local municipalities to avoid long- and short-term adverse impacts associated with the occupancy and modification of floodplains and the destruction and modification of wetlands.

Wetlands are those areas inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (USACE 1987).

Section 404 of the Clean Water Act (CWA) of 1977 (P.L. 95-217) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into Waters of the U.S., including wetlands. Waters of the U.S. (Section 328.3[2] of the CWA) are those waters used in interstate or foreign commerce, subject to ebb and flow of tide, and all interstate waters including interstate wetlands. Waters of the U.S. are further defined and may include waters such as intrastate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, natural ponds, or impoundments of waters, tributaries of waters, and territorial seas. Jurisdictional boundaries for Waters of the U.S. are defined in the field as the Ordinary High Water Marks (OHWM) which is that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural lines impressed on the bank, shelving, changes in the character of soil,

destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

The Supreme Court ruling in the Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers case ("SWANCC", Case No. 99-1178) on January 9, 2001 restricted the USEPA and USACE's regulatory authority over waters of the U.S. under the Clean Water Act. The Court ruled that 33 CFR Section 328.3(a)(3) (1999) pursuant to the "migratory bird rule," 51 *Federal Register* 41217 (1986), exceeds the authority granted to these agencies under Section 404 of the CWA. Waters that could affect interstate commerce solely by virtue of their use as habitat by migratory birds are no longer considered "Waters of the U.S." under SWANCC. The ruling mainly affects those areas defined as Waters of the U.S. in 33 CFR Section 328.3(a)(3) (1999). Areas that are, or potentially, affected by SWANCC include: intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs prairie potholes, wet meadows, playa lakes, or natural ponds.

Past investigations have stated that there are no identified jurisdictional wetlands found within the project corridor (USACE 2000); however, recent in-depth surveys revealed that several washes and draws, including the San Pedro River, that occur within the project corridor could be considered jurisdictional Waters of the U.S. In fact, preliminary engineering estimations identify 60 low water crossings that may be required to accomplish construction of either of the action alternatives. Many of these areas have the potential to be inundated during rainfall periods and some have the ability to support wetland vegetation. During the April 2002 survey, approximately 8.3 acres of potential jurisdictional wetlands and 28.8 acres of unvegetated potential Waters of the U.S. were identified in the project corridor.

3.13 SOCIOECONOMICS

3.13.1 Population

The 2000 census estimated the population of Cochise County to be 117,755 (U.S. Census Bureau 2001). This is an increase of 15 percent over the revised 1990 census population of 97,624. Naco (833) is the only community located in the Naco Station's AO and within the vicinity of the project corridor. Douglas (14,312) is the only major

community located in the Douglas Station's AO and within the vicinity of the project corridor.

The racial diversity of the Cochise County comprised mainly of Caucasians (76%) and African-Americans (4.5%). The remaining 19.5% is split among Asian and Pacific Islanders, Native Americans and other races. Less than half of the total population (30%) claim to be of Hispanic or Latino race. This has changed slightly from the 1990 racial mix mainly comprised of Caucasians (82%) and African-Americans (5%) with the remaining 13% split among Asian and Pacific Islanders, Native Americans, and other races (U.S. Bureau of the Census 2001). Similarly, the Town of Naco is mainly comprised of Caucasians (63%) and African-Americans (0.5%). The remaining 36.5% claims some other race, with a small portion split among Asian and Pacific Islanders and Native Americans.

3.13.2 Employment and Income

The total number of jobs within Cochise County was 50,041 in 2000. This is a 19% increase over the 1990 total number of jobs of 40,633 (BEA 2002). The annual average unemployment rate for Cochise County was 4.6% in 2001 and 10.7% in 1994. This decrease is similar to the average unemployment rate in 2001 for the State of Arizona, which was 4.7%. When compared to a steady statewide unemployment rate of 5.6% in 1994, data suggest that Cochise County has experienced a significant drop in the unemployment rate since the early 1990s (Arizona Department of Economic Security 2002).

In 2000, Cochise County had a total personal income (TPI) of $2.3 billion, which ranked 8th in the state and accounted for 1.8% of the state total (BEARFACTS 2002). In 1990, the TPI for Cochise County was $1.3 billion and ranked 7th in the state. The average annual growth rate for TPI over the past 10 years was 3.2%, which was lower than both the average annual growth rates for the state, 3.8%, and the nation, 4.2%. Per Capita Personal Income (PCPI) for Cochise County was $19,153 in 2000 (BEARFACTS 2002). This PCPI ranked 6th in the state, and was 77% of the state average of $24,988 and 65% of the national average of $29,469. In 1990 the PCPI of Cochise County was $14,015 and ranked 7th in the state. The average annual growth rate for PCPI over the past 10 years was 3.2%, which was lower than both the average annual growth rates for

the state, 3.8%, and the nation, 4.2%. The median household income, 1997 model-based estimate, for Cochise County is $29,295. This is lower than the median household income for the State of Arizona of $34,751. An estimated 23,611 people of all ages within Cochise County live below the poverty level (based on the 1997 model). This accounts for 21.7% of the population of Cochise County, which is greater than the 15.5% of people of all ages in poverty for the state (U.S. Census Bureau 2002).

3.13.3 Housing

The total number of housing units in Cochise County was 51,126 in 2000, representing roughly 2.31% of the total housing units reported for the State of Arizona (U.S. Census Bureau 2002). Of the housing units within Cochise County, 43,893 (86%) are occupied and the remaining 7,233 (14%) are vacant (U.S. Census Bureau 2002). Density of housing units within Cochise County is 8.3 units per square mile.

According to the Arizona Housing Commission, Cochise County has experienced a 2.6% growth rate in the Town of Naco. There are 298 housing units, which represent less than 1% of the total housing units for Cochise County. Of these, 260 (87.2%) are occupied and 38 (12.8%) are vacant, while in the City of Douglas, 5,186 housing units represent 10% of the total housing units for Cochise County. Of these, 4,526 (87.3%) are occupied and 660 (12.7%) are vacant. The report, *The State of Housing in Arizona*, produced by the Arizona Housing Commission in 2000 states that Arizona is currently going through a housing crisis where housing prices are rising twice as fast as income statewide. This is of particular importance to low income and minority households. For both minority and non-minority households, the incidence of housing problems increases dramatically as income levels decrease. Since the percent of minority households that are low income far exceeds the proportionate number in the general population, minorities suffer disproportionately in terms of their basic need for adequate and affordable shelter. This is

Households with Housing Problems Reported in *The State of Housing In Arizona*

- Persons and families living in units with physical defects (lacking complete kitchen or bath)
- Persons or families living in overcrowded conditions (greater than one person/room)
- Persons and families cost burdened (paying more than 30% of income for housing including utilities)

Source: Arizona Housing Commission 2000

particularly alarming considering the growth rate of minority populations in Arizona (Arizona Housing Commission, 2000). It is estimated that 19% of the households within Cochise County have a housing problem.

3.14 NOISE

There are three common classifications of noise:

- General audible noise that is heard by humans;
- Special noise, such as sonic booms and explosions that can have a sound pressure or shock component;
- Noise-induced vibration typically caused by sonic booms and artillery blasts involving noise levels that can cause physical movement (i.e., vibration) and even possible damage to natural and man-made structures such as buildings and cultural resource structures.

Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as a sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB. Because of the logarithmic nature of the decibel scale, sound levels do not add and subtract directly. If a sound's intensity is doubled, the sound level generally increases by 3 dB, regardless of the initial sound level. For instance:

60.0 dB + 60.0 dB = 63 dB and 80.0 dB + 80.0 dB = 83 dB

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB

Generally, the human ear can hear frequencies from about 20 (Hertz) Hz to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz ranges. When measuring community response to noise, it is common to adjust the frequency content of the measured sound to correspond to the frequency sensitivity of the human ear. This adjustment is called A-weighting (American National Standards Institute [ANSI] 1988). Sound levels that have been adjusted are referred to an A-weighted sound levels. The amplitude of A-weighted sound levels is measured in dB. It is common to denote the unit of A-weighted sounds by dBA or dB(A). The A-scale de-emphasizes the low and high frequency portions of the sound spectrum and provides a good approximation of the

response of the average human ear. On the A-scale, 0 dBA represents the average least perceptible sound, such as gentle breathing, and 140 dBA represents the intensity at which the eardrum may rupture, such as a jet engine at open throttle (National Research Council 1977).

Figure 3-8 is a chart of A-weighted sound levels of typical sounds. Some are continuous sounds (e.g., air conditioner, vacuum cleaner) whose levels are constant for some time. Some are the maximum sound during a vehicle passby (e.g., automobile, heavy truck). Some are averages over some extended period (e.g., urban daytime, urban nighttime). Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the USEPA (1972) and has been adopted by most Federal agencies (Federal Interagency Committee on Noise [FICON] 1992).

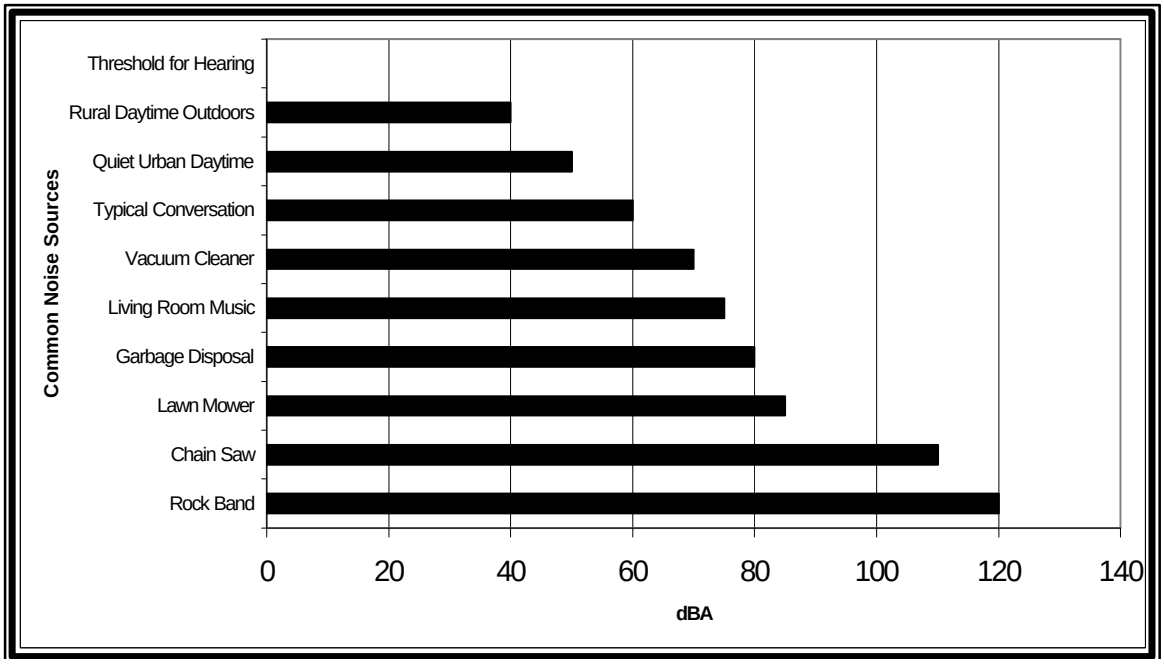

Figure 3-8. Typical Sound Levels of Common Noise Sources

A DNL of 65 dB is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction, which do cause noise. Areas exposed to DNL above 65 dB are generally

not considered suitable for residential use. A DNL of 55 dB was identified by the USEPA as a level below, which, there is effectively no adverse impact (USEPA 1972).

Of the three common classifications of noise, special noises such as explosion are not likely to occur during construction. However, this is dependent on whether soils can be moved with conventional construction equipment.

3.15 SOLID AND HAZARDOUS WASTE

The USEPA in 1996 listed approximately 15,000 uncontrolled hazardous waste sites in the U.S. The majority of the uncontrolled hazardous waste sites are waste storage/treatment facilities or former industrial manufacturing sites. The chemical contaminants released into the environment (air, soil or groundwater) from uncontrolled waste sites may include heavy metals, organics, solvents and other chemicals. The potential adverse human health impact of hazardous waste sites is a considerable source of concern to the general public as well as government agencies and health professionals.

Within the Naco-Douglas corridor, the Phelps Dodge Corporation owns and maintains a slag stockpile generated during previous copper smelting operations that ceased in 1987. In December 1999, Phelps Dodge Corporation acquired Cyprus Amax Minerals' operations in Arizona making Phelps Dodge Corporation the second largest copper company in the world along with being the world's largest producer of SX-EW cathode copper. In support of the ongoing Whitewater Draw project (INS 2001d) a soil analysis was conducted in the immediate vicinity of Whitewater Draw and proposed construction alignments (Kleinfelder 2002). The analysis concluded that arsenic and lead were detected in all seven of the samples taken. However, concentrations were below Arizona Department of Health Services soil remediation levels (SRLs) for non-residential in accordance with ADEQ requirement for remediation of heavy metals under the Arizona Administrative Code (AAC Title 18, Chapter 7, Appendix A). Since it was concluded that lead and arsenic concentrations were below regulatory limits in surface soils of the whitewater Draw Area, it was recommended that remedial action were not warranted at this time.

Outside the Phelps Dodge Corporation land, there are no known or suspected areas of toxic and/or hazardous material contamination within the proposed project corridor. However, due to the evidence of illegal and uncontrolled dumping in several areas of the corridor, it is possible that potentially hazardous wastes may have been dumped. No overt environmental liabilities were observed during the field surveys conducted in April 2002; however, a Phase I Environmental Site Assessment in accordance with American Society for Testing and Materials (ASTM) protocol has not been prepared.

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